

A GUIDE

FOR THE Practical Gauger,

With a Compendium of *Decimal Arithmetick*.

Shewing briefly

- I. Many plain and easie ways how to Gauge Brewers *Tuns, Coppers, Backs, &c. also the Mash-Tun*, either in whole, or gradually from Inch to Inch, with divers new Tables for facilitating the Work.
- II. The Gauging of any Wine, Brandy, Ale or Oyl-Cask, either in whole, or in part, with the Construction and use of Two Tables of *Area's of Circles*, and *SYBANT HANTZ* his Table of Area's of Segments of a Circle.
- III. The Mensuration of all manner of Superficies, as Board, Glass, Pavement, Wainscot, Tiling, Floors, Roofs, &c. also Brick-work, Timber and Stone.

Added as an Appendix to the former Work.

Collected and published principally for the Service of the Farmers of his Majesties Revenue of Excise.

By *WILLIAM HUNT*,
Student in the Mathematicks.

Primum intellige, tunc corrige.

London, Printed by *John Darby*, for *Nath. Ponder*, at the sign of the Peacock in *Chancery-Lane*. 1673.

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FOR THE

Practical Chemistry

With a Contribution of David Johnston.

1941-1942

1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

[illegible]

...the ... of all ...
...the ... of all ...
...the ... of all ...

Appendix to the Report of the

2. The first and second paragraphs of the first article of the law are amended as follows:

THE END OF THE LINE

Stellen in die Abtheilung.

1900

1933

TO THE
FARMERS

OF HIS
Majesties Revenue of *Excise*,
WILLIAM HUNT

Wisheth all Health and Felicity.

Worthy Sirs,



He general report
of your inclina-
tions and good
affections to Nu-
merical learning in general,

A 2 and

The Epistle Dedicatory.

and especially to that part which is the subject of this little Treatise; (*partly induced thereunto by reason of your present great undertaking*) hath imboldned me to dedicate these my Conceptions therein to your Patronage and Acceptance.

Should I attempt to enumerate the Excellencies of *Arithmetick* and *Geometry*, and the Benefits received by them (*they being worthily called the Primum Mobile*

The Epistle Dedicatory.

Mobile, in respect of the other inferior Orbs) I should but beat the ayr, and swim against the stream; for I cannot but acknowledg, the expression of their worth, is as far beyond the reach of my Pen, as this Treatise from the Perfection of those Arts.

Hoping therefore, that affecting the Arts, you will not dis-affect the Artist, nor my endeavours to be serviceable to you in that kind

A 3 (*which*

The Epistle Dedicatory.
(*which is the Vertex of my
Ambition*) humbly intreat-
ing your favourable recep-
tion, I remain,

*Yours in all humble ser-
vice to be commanded.*

WILLIAM HUNT.

To

To his much Respected Friend
T H O M A S C O C K E T,
OF THE
Parish of Cripplegate, London, Gent.

S I R,



He subject of the following Discourse, being a matter you are frequently conversant with in your Negotiations, together with your known good will to Arts and Artists, hath encouraged me to offer the little experience I have acquired (the Issues of some spare hours) to your censure and acceptance; being well satisfied, that thereby it will receive the freer passage to Publick Utility (which is my whole design:) Accept it then, kind Sir, as the best means of my acknowledgement for your

many kindnesſes towards me: And by your willing Reception, let it appear you own me for a FRIEND; ſo will you oblige him to a remembrance of your paſt favours, and a covetouſneſſ of your further acquaintance, who rejoyceth that he hath the opportunity to ſubſcribe himſelf,

A real Lover of you, and
your whole Family,

WILLIAM HUNT.

From my Houſe neer the ſign of
the Golden Hind in Little-
Moor-fields, October the 25th,
1673. where any perſon may be
inſtructed in this and other
parts of the Mathematicks.

TO

To the Courteous
R E A D E R.

S I R,



Geometry being the principal Subject of this small Treatise, I presume needs not court thy favourable Reception, nor any great store of Rhetorick to make it appear more splendid and glorious to the World, since it carrieth along with it the force of DEMONSTRATION.

The Design of this short Tract, is principally to instruct the Practical GAUGER, who (I hope) will not despise it for the plainness of the Garb; but rather imbrace it for the sake of the many Practical Conclusions contained therein.

Yet considering, that there are not more Men than Minds, every one judging, according to his own fancy, I shall not wonder if there be some Legentes & Negligentes Readers and Contemners of these my Endeavours, since to please all, is, and hath been a Task too difficult for the best of Authors to perform.

However,

To the READER.

*However, having bent my study to level at the
Mark, and endeavour'd to hit the White,*

Huc quæso Nardine; oculos, huc dirige mentem.

*Afford it then thy candid and favourable censure,
and therein thou wilt oblige him, who is*

A real Friend to all that are
Mathematically inclined,

WILLIAM HUNT.

To

To the Reader upon the following Work,

A Way with those Impostors that pretend
To higher matters; striving for to mend
Anothers faults; whilst they themselves do miss
The Truth here taught, and know not what it is.
This Work shall live, their malice to survive,
Their spight t' outface, their envy to deprive;
For in the following Tract, is taught a way
To guide those Wandring Minds that go astray;
Ignorance informs, the simple to Direct,
And such as Walk in Error to Correct.
Not only so, he farther does propose
A certain Method, if you truth will chose,
To Gauge all Vessels full, or full in part
Of any form: And by true Rules of Art
Has Built a Structure firmly to endure,
Whose ruine Time, nor Age, can e're procure.

*View then the Work, and therein thou shalt find
An honest heart, and an ingenious mind.*

W. SALMON Med. Profes.

Upon

Upon his Ingenious and worthy Friend,
and his Book, entituled, *A Guide for
the Practical Gauger.*

An Acrostick.

W|When first I cast my eye upon thy Book,
I|I was amaz'd to see what pains you 'ave took;
L|Lively unfolding to 's the Gauging Art,
L|Leading from Theory to the Practick part.
I|I therefore give thee thanks for writing this }
A|After so plain a Method, none can mis, }
M|Making it free from all obscurities. }
H|Howe're if Carpers do, without a Cause,
U|Use their worst rage, & 'gainst thee make a noise;
N|Ne're be discourag'd at their angry Frown;
T|Thy work shall stand, when their's shall Tumble
(down.

Jacob Lambe Med. Prof.

Upon

*Upon his Ingenious Friend the Author, and his
Guide to the Practical Gauger.*

I Was astonish'd, when this Work I view'd,
Wherein the Author hath such cunning shew'd
In Gauging Vessels, whether wet or dry,
Full, or in part full, upright or awry;
That in this useful Art of Gauging, now
Better to write, few men (I judge) know how:
No case can hap in Vessels great or small,
But this short Treatise comprehends them all,
Long, Square, Round, Oval, of what Form so'e're,
Their Mensuration, be hath taught with care;
By Arithmetick and Geometry's true Rules,
That none can carp thereat, but prating—
These are the Arts are Crown'd by all with Bays,
Which makes me thus the Author for to Praise,
And wish he may Receive his due Deserts,
Love, and Encomiums from Ingenious Hearts.

P. G.

Upon

Upon his Ingenious Friend the AUTHOR.

’T Was a Rough Task (*my Friend*) you undertook,
When you began to write this little Book :
So many *Crook’d Meanders* there did lie
In this rare Art : But from obscurity
Thou’s set it free ; that *Momus* needs must say,
Thou out of *Darkness* hast created *Day*.
Great *Archimedes* if he liv’d agen,
He would *admire* thy learned dextrous Pen ;
Then Let me wonder ! Since I cannot Praise ;
He must *deserve*, that’s fit to give thee Bays.
Yet what thou’st done, *is well*, ’tis well ’tis done ;
If thus thy *Morn*, sure thy *Meridian Sun*
Will give a *Light*, whereby the *Blind* may see
Thee brightly shine unto *Eternity*.

HENRY CRAWFORD

A Table

UPON THE
AUTHOR
And his WORK.

LET *Criticks* Carp against thy Work and thee,
Whilst I commend it, since thou art so free
Thus to discover what thou know'st in ART,
Both in the *Theory* and *Practick* part
Of *Gauzing*; which is now become so pure
A *Ne plus ultra* may be put I'm sure.
How much of late years has been writ hereon?
And yet room left for thee to Build upon:
Go on! *Brave Soul*, still search, thy *Active Pate*
Is always Eusi'd, thou regard'st not Fate,
But Aim'st at Common, more than private good,
Which shews thy veins are fill'd with Generous
blood.

To such as in strange paths are led aside,
Thou here has sent a Welcome pleasant *Guide*
For to Direct them; let them view each page
With understanding, and Attain to *Gauge*.
All Vessels, though of various forms they be,
Round, Square or Oval, 'tis all one to thee,

Tune

Tuns, Backs and Coolers, Coppers, and the rest,
Cum multis aliis, work as you like best.
 Here's all variety you can desire,
 Return our Author thanks, and then Aspire
 To understand each *Problem* in his *Guid*,
 Which he with Diligence hath often try'd.
 Words will not Reach his Worth, *Hyperbolize*
 I can't, nor sound his Fame up to the skies;
 Yet this I'll say, and still add to his praise,
 That he alone in this deserves the Bays.

Henry Coley Philom.

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Sybrant Hantz his Table of *Area's of Segments of a Circle*, whose *Diameter* is supposed to be divided by the *Chord-lines* into 10000 equal parts, and the *Area* of the whole Circle Unity, or 100000 other parts.

Verf.Sine	Segment.	Dif.	Segment.	Verf.Sine.
.4210	.39984 $\frac{1}{1}$		.60016 —	.5790
.4220	.40109 $\frac{1}{1}$	.125	.59891 $\frac{1}{1}$	.5780
.4230	.40235 $\frac{1}{1}$	.126	.59765 —	.5770
.4240	.40361 $\frac{1}{1}$	.126	.59639 —	.5760
.4250	.40487 $\frac{1}{1}$	.126	.59513 —	.5750
		.126		
.4260	.40613 $\frac{1}{1}$	.126	.59387 —	.5740
.4270	.40739 $\frac{1}{1}$	.126	.59261 —	.5730
.4280	.40865 $\frac{1}{1}$	.126	.59135 —	.5720
.4290	.40991 —	.126	.59009 $\frac{1}{1}$	.5710
.4300	.41117 $\frac{1}{1}$	.126	.58883 —	.5700
		.126		
.4310	.41243 $\frac{1}{1}$	.126	.58757 —	.5690
.4320	.41369 $\frac{1}{1}$	.126	.58631 —	.5680
.4330	.41495 $\frac{1}{1}$	.126	.58505 —	.5670
.4340	.41621 —	.126	.58379 $\frac{1}{1}$	.5660
.4350	.41747 $\frac{1}{1}$	.127	.58253 $\frac{1}{1}$	.5650
.4360	.41874 $\frac{1}{1}$	.126	.58126 —	.5640
.4370	.42000 $\frac{1}{1}$	.126	.58000 —	.5630
.4380	.42126 —	.126	.57874 $\frac{1}{1}$	.5620
.4390	.42252 —	.126	.57748 $\frac{1}{1}$	.5610
.4000	.44378 $\frac{1}{1}$	.127	.57622 —	.5600

Sybrant Hantz, his Table of *Area's of Segments of a Circle*, whose *Diameter* is supposed to be divided by the *Chord-lines* into 10000 equal parts, and the *Area* of the whole Circle Unity, or 100000 other parts.

Verf. Sine.	Segment.	Dif.	Segment.	Verf. Sine
.4410	.42505 —		.57495 —	.5590
.4420	.42631 —	.126	.57369 —	.5580
.4430	.42758 —	.127	.57242 —	.5570
.4440	.42885 —	.127	.57115 —	.5560
.4450	.43011 —	.126	.56989 —	.5550
		.127		
.4460	.43138 —		.56862 —	.5540
.4470	.43265 —	.127	.56735 —	.5530
.4480	.43391 —	.126	.56609 —	.5520
.4490	.43518 —	.127	.56482 —	.5510
.4500	.43644 —	.126	.56356 —	.5500
		.127		
.4510	.43771 —		.56229 —	.5490
.4520	.43898 —	.127	.56102 —	.5480
.4530	.44024 —	.126	.55976 —	.5470
.4540	.44150 —	.126	.55850 —	.5460
.4550	.44277 —	.127	.55723 —	.5450
		.127		
.4560	.44404 —		.55596 —	.5440
.4570	.44531 —	.127	.55469 —	.5430
.4580	.44658 —	.127	.55342 —	.5420
.4590	.44785 —	.127	.55215 —	.5410
.4600	.44912 —	.127	.55088 —	.5400

Sybrant Hantz, his Table of *Area's of Segments of a Circle*, whose *Diameter* is supposed to be divided by the *Chord-lines* into 10000 equal parts, and the *Area* of the whole Circle Unity, or 100000 other parts.

Verl. Sine.	Segment	Dif.	Segment	Verl. Sine.
.3810	.34993	124	.65007	.6190
.3820	.35117	123	.64883	.6180
.3830	.35240	124	.64760	.6170
.3840	.35364	124	.64636	.6160
.3850	.35488	124	.64512	.6150
.3860	.35612	124	.64388	.6140
.3870	.35736	124	.64264	.6130
.3880	.35860	124	.64140	.6120
.3890	.35984	124	.64016	.6110
.3900	.36108	124	.63892	.6100
.3910	.36232	125	.63768	.6090
.3920	.36357	124	.63643	.6080
.3930	.36481	125	.63519	.6070
.3940	.36606	125	.63394	.6060
.3950	.36731	124	.63269	.6050
.3960	.36855	124	.63145	.6040
.3970	.36979	125	.63021	.6030
.3980	.37104	124	.62896	.6020
.3990	.37228	125	.62772	.6010
.4000	.37353	125	.62647	.6000

A a

A Table

Sybrant Hantz his Table of *Area's of Segments of a Circle*, whose *Diameter* is supposed to be divided by the Chord-lines into 10000 equal parts, and the *Area* of the whole Circle Unity, or 100000 other parts.

Verf. Sine.	Segment.	Dif.	Segment.	Verf. Sine.
.4010	.37478—	.125	.62522—	.5990
.4020	.37603—	.125	.62397—	.5980
.4030	.37728—	.125	.62272—	.5970
.4040	.37853—	.125	.62147—	.5960
.4050	.37978—	.125	.62022—	.5950
.4060	.38103—	.125	.61897—	.5940
.4070	.38228—	.125	.61772—	.5930
.4080	.38353—	.125	.61647—	.5920
.4090	.38478—	.125	.61522—	.5910
.4100	.38603—	.125	.61397—	.5900
.4110	.38728—	.125	.61272—	.5890
.4120	.38854—	.125	.61146—	.5880
.4130	.38979—	.125	.61021—	.5870
.4140	.39104—	.126	.60896—	.5860
.4150	.39230—	.125	.60770—	.5850
.4160	.39355—	.126	.60645—	.5840
.4170	.39481—	.125	.60519—	.5830
.4180	.39606—	.125	.60394—	.5820
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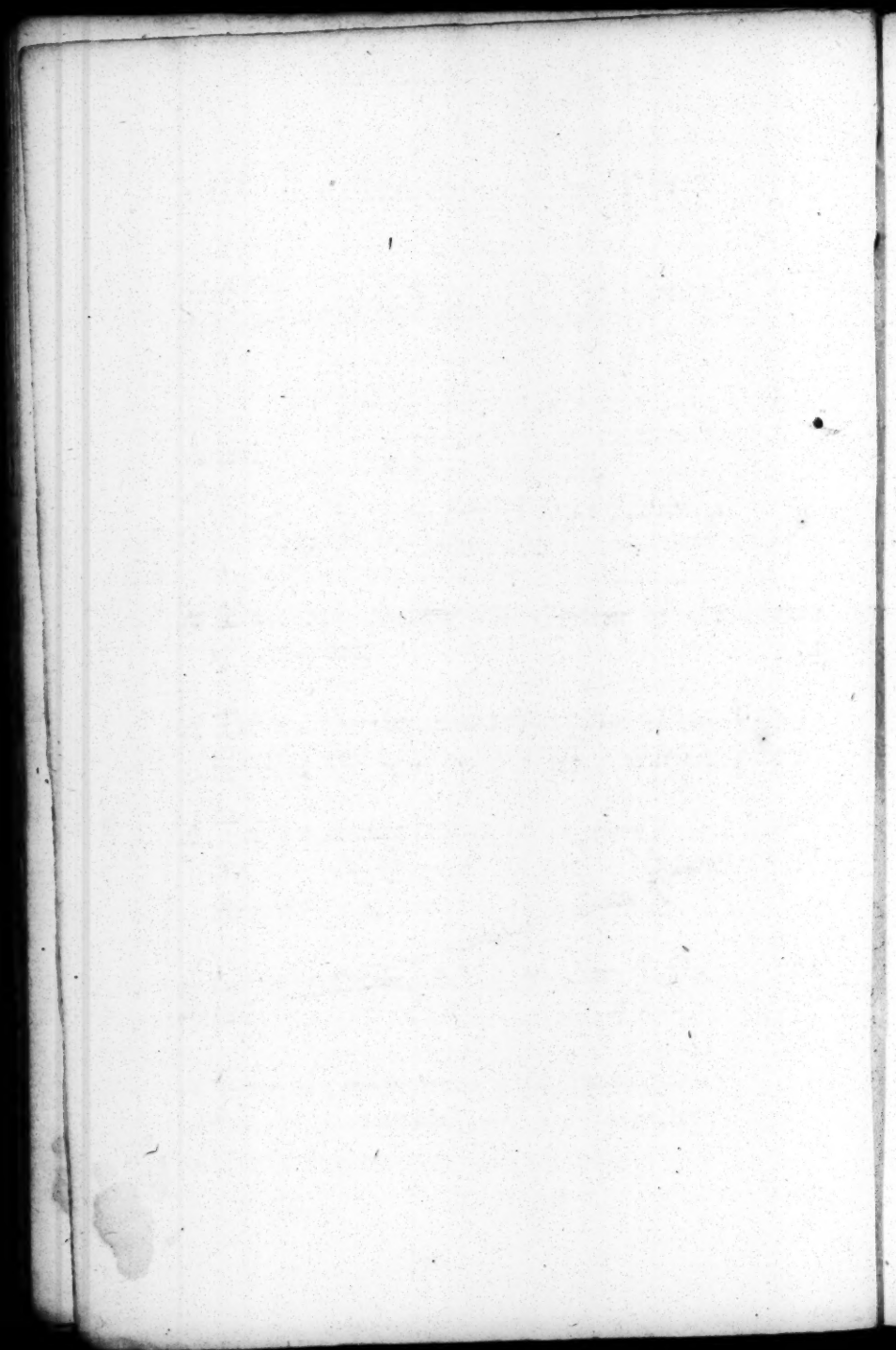
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Verf. Sine.	Segment.	Dif.	Segment.	Verf. Sine
.4610	.45039	.127	.54961	.5390
.4620	.45166	.127	.54834	.5380
.4630	.45293	.127	.54707	.5370
.4640	.45420	.127	.54580	.5360
.4650	.45547	.127	.54453	.5350
.4660	.45674	.127	.54326	.5340
.4670	.45801	.127	.54199	.5330
.4680	.45928	.127	.54072	.5320
.4690	.46055	.128	.53945	.5310
.5700	.46183	.127	.53817	.5300
.4710	.46310	.127	.53690	.5290
.4720	.46437	.127	.53563	.5280
.4730	.46564	.127	.53436	.5270
.4740	.46691	.127	.53309	.5260
.4750	.46818	.128	.53182	.5250
.4760	.46946	.127	.53054	.5240
.4770	.47073	.127	.52927	.5230
.4780	.47200	.127	.52800	.5220
.4790	.47327	.127	.52673	.5210
.4800	.47454	.127	.52546	.5200

Sybrant Hantz, his Table of *Area's of Segments of a Circle*, whose *Diameter* is supposed to be divided by the *Chord-lines* into 10000 equal parts, and the *Area* of the whole Circle Unity, or 100000 other parts.

Verf.Sine.	Segment.	Dif.	Segment.	Verf.Sine.
.4810	.47581—		.52419—	.5190
.4820	.47708—	.127	.52292—	.5180
.4830	.47835—	.127	.52165—	.5170
.4840	.47963—	.128	.52037—	.5160
.4850	.48090—	.127	.51910—	.5150
		.128		
.4860	.48218—		.51782—	.5140
.4870	.48345—	.127	.51655—	.5130
.4880	.48472—	.127	.51528—	.5120
.4890	.48600—	.128	.51400—	.5110
.4900	.48727—	.127	.51273—	.5100
		.127		
.4910	.48854—		.51146—	.5090
.4920	.48989—	.127	.51019—	.5080
.4930	.49109—	.128	.50891—	.5070
.4940	.49236—	.127	.50764—	.5060
.4950	.49364—	.128	.50636—	.5050
		.127		
.4960	.49491—		.50509—	.5040
.4970	.49618—	.127	.50382—	.5030
.4980	.49745—	.127	.50255—	.5020
.4990	.49873—	.128	.50127—	.5010
.5000	.50000—	.127	.50000—	.5000

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GUIDE

FOR THE

Practical Gauger.
With a Brief Compendium of
Decimal Arithmetick.



He that desires to be a Proficient in Practical Gauging, ought first to be well acquainted with the Doctrine of *Decimals*; which are Numbers made use of instead of Fractions; whereby those tedious Reductions in Calculations are avoided, and the Art rendered serviceable, even to those who have attained but a small measure of knowledge in Vulgar Arithmetick.

B

CHAP.

CHAP. I.

I. *Notation of Decimals.*

Note I.

A *Single Fraction* having for its *Denominator* a number consisting of *Unity* or 1, in the last place towards the left hand, and nothing but a *Cypher* or *Cyphers* towards the right, it is more particularly called a *Decimal Fraction*.

Example.

Numerator 5 15 190 1070 10830

Denominator 10, 100, 1000, 10000, 100000.

Note II.

A *Decimal Fraction* is not written in a smaller figure, as the *Vulgar Fraction*, but in the same figure as the *Integer*, or whole number, by prefixing a point or comma between them, for distinction sake: So 1. $\frac{5}{10}$ is written thus, 1.5 or 1,5

Note III.

In Decimals thus express, the *Denominator* is discovered by the places of the *Numerator*, & contra. For of how many places soever the *Numerator* of a *Decimal Fraction* doth consist, of

[3]

so many Cyphers with a Unit before them, doth the *Denominator* consist.

So the *Denominator* of .5 is 10, of .05 is 100, of .005 is 1000, and so on *ad infinitum*.

Note IV.

When the *Numerator* of a *Decimal Fraction* consists not of so many Places, as the *Denominator* hath cyphers, prefix so many cyphers on the left hand, as directed (in *Note III.*)

So $\frac{1}{10}$ is written thus .05, thus .015, thus .0050, thus .006.

Note V.

Cyphers at the end of a *Decimal Fraction*, do neither augment, nor diminish the value thereof.

So 2, 20, 200, 2000, are *Decimals* of one and the same value. For when the *Numerator* and *Denominator* do each end with a *Cypher*, or *Cyphers*, cut off equal *Cyphers* in both, so will the fraction be reduced into lesser terms.

20	200	2000	2	0
			10	0
			—	—
			2	00
			10	00
			—	—
			2	000
			10	000
			—	—

Thus $\frac{20}{100}$, $\frac{200}{1000}$, $\frac{2000}{10000}$, are reduced into $\frac{2}{10}$ as in the margin

Note VI.

Decimals are easily reduced to one common *Denominator*, by placing a cypher or cyphers on the right hand of such *Numerators* as are defective, making them to consist of the same number of places.

Thus 2, 03, 025, (which signifie $\frac{2}{100}$, $\frac{03}{1000}$, $\frac{025}{10000}$) may be reduced unto these, 200, 030, 025, which have 1000 for a common *Denominator*.

Note VII.

Cyphers being added to any number towards the right hand, increase that number in *Vulgar Arithmetick Ten-fold*: But Cyphers added to the left hand of any number in *Decimals*, decrease it *Ten-fold*.

Examples.

17 with a cypher in Vulgar	} Arithme- tick is	170
17 with a cypher in Decimal		017
		1000

Note VIII.

In *Decimals*, it suffices to express only the *Numerators*, the *Denominators*, whether Pounds, Yards, Feet, Gallons, Barrels, &c. being supposed to be divided into 10, 100, 1000, or 10000 equal parts.

Note IX.

To Reduce a Vulgar Fraction to a Decimal.

Rule.

To the Numerator of the given fraction, add what number of cyphers you please, and divide it by the Denominator, the Quotient is the Decimal fraction.

Examples.

17 shillings, which is $\frac{17}{20}$ of a Pound.

1 peny, which is $\frac{1}{240}$ of a Pound.

1 farthing, which is $\frac{1}{960}$ of a Pound.

9 inches, which is $\frac{9}{12}$ of a Foot.

20) 17.00000 (.85000 the decimal for 17 shill.

240) 1.00000 (.00417 decimal for a peny.

960) 1.00000 (.00104 decimal of a farthing.

12) 9.00 (.75 decimal of 9 inches.

A Decimal Table of the Parts (quàm proximè)

Shillings	Decimals of a Pound.	Shillings	Decimals of a Pound.
19	.95000	9	.45000
18	.90000	8	.40000
17	.85000	7	.35000
16	.80000	6	.30000
15	.75000	5	.25000
14	.70000	4	.20000
13	.65000	3	.15000
12	.60000	2	.10000
11	.55000	1	.05000
10	.50000		

Pence

of a Pound Sterling.

Pence with Farthings	Decimals of a Pound.	Pence with Farthings	Decimal of a Pound.
0.1	.00104—	6.1	.02642+
0.2	.00208—	6.2	.02708—
0.3	.00313+	6.3	.02812—
1.0	.00417+	7.0	.02917+
1.1	.00521+	7.1	.03021+
1.2	.00625	7.2	.03125
1.3	.00729—	7.3	.03229—
2.0	.00833—	8.0	.03333—
2.1	.00937—	8.1	.03438+
2.2	.01042+	8.2	.03542+
2.3	.01146+	8.3	.03646+
3.0	.01250	9.0	.03750
3.1	.01354—	9.1	.03854—
3.2	.01458—	9.2	.03958—
3.3	.01563+	9.3	.04063+
4.0	.01667+	10.0	.04167+
4.1	.01771—	10.1	.04271+
4.2	.01875	10.2	.04375
4.3	.01979—	10.3	.04479—
5.0	.02083—	11.0	.04583—
5.1	.02188+	11.1	.04688+
5.2	.02292+	11.2	.04792+
5.3	.02396+	11.3	.04860+
6.0	.02500		

I. How to reduce a Decimal Fraction to a Vulgar.

First, Draw a perpendicular line before the *Decimal Fraction*, and multiply it by the next *lower Denomination* of the Integer, or whole Number; And so much of the product as falleth on the left hand of the line, is the value in that *Denomination*: And if any Decimals remain on the other side of the line, after the same Method, you may find the value thereof in the next *lower Denomination*; and so on to the Least Known part of the Integer.

Examples.

— .3625 Decimal of a pound.

— .20 Shillings in a pound.

Shillings 7 | 2500
12 Pence in a Shilling.

Pence 3 | 0000

| .674 Decimal of a pound.
20 Shillings in a pound.

Shillings 13 | 480
12 Pence in a Shilling.

Pence 5 | 760
4 Farthings in a penny.

F. 3 | 040

Inches

[9]

|.75 Decimal of a foot.
12 Inches in a foot.

Inches 9|00

|.009375 Decimal of a pound.
20

0|187500
12

Pence 2|250000
4

Farth. 1|000000

II. Addition of Decimals.

This is the same with Addition of whole Numbers, only you must observe an Order in placing them (*that is*) place every Number under its proper Denominator; Integers, or whole Numbers, under Integers, or whole Numbers; Tenths, or Primes, under Tenths, or Primes; And Seconds, under Seconds, &c. Distinguishing the whole Numbers from the Fractions, by a point or comma, and then adding them together as whole Numbers, still setting down the excess above Ten, and so carrying the Tenths to the next place towards the left hand.

Examples

[10]

Examples.

lb	lb		
25.7250	13.56781	.125	32.056
46.6375	44.54695	.39	7.07
<hr/>	17.25007	.7	.9
Sum - 72.3625	<hr/>	<hr/>	<hr/>
	Su. 75.36483	1.215	40.026

III. Subtraction of Decimals.

In subtracting one Decimal from another, observe the same Order in placing the Numbers given, as directed in Addition, and then subtract the lesser from the greater, as in whole Numbers.

Note XI.

When the Decimals in both Numbers given, consist not of the same number of places, that Decimal which is defective in places towards the right hand, must be filled up with Cyphers, or at least Cyphers must be supposed to be added.

Examples.

If .04338 be subtracted from .55
the remainder will be .50662. as in the .55000
Margent, where you see the void places .04338
towards the right hand, are supplied
with Cyphers

$$\begin{array}{r} 24.04338 \\ .65 \end{array} \quad \begin{array}{r} 37. \\ 0.104 \end{array} \quad \begin{array}{r} 1.384.327.250 \\ 1.27.27.13 \end{array}$$

$$23.39338 \text{ Remains } 36.896 \quad 114.300.120$$

$$24.04338 \text{ Proof } 37.000 \quad .384.327.250$$

IV. Multiplication of Decimals.

In any of the cases which can happen in Multiplication of *Decimals*, Multiply the Numbers given, as if they were whole Numbers, then cut off or separate as many figures from the product towards the right hand, by a point or comma, as there are fractions in the *Multiplicand*, *Multiplicator*, or both : Which figures so cut off or separated, are the fraction of the product, and the figures towards the left hand of the point or comma, shall be the Integers or whole Numbers of that Product: (And if they do not make so many, they must be supplied with a Cypher or Cyphers, which may happen when the Product is a fraction.)

I.	II.	III.	IV.
1.305	246.25	.03755	.75
5.63	.35	.025	.0125
—	—	—	—
3915	123125	18775	375
7830	73875	7510	150
6525			75
—	—	—	—
73.4715	8618.75	.00093875	.009375

Note

039. 750. 480. 1

20. 7. 70. 1 Note XII.

In Multiplication of whole Numbers, the product is always increased so many times more than the *Multiplicand* as the *Multiplicator* contains *Units*; as 3 times 4 makes 12.

But in Multiplication of fractions, the product is always less, than either of the two Numbers alone, as in *Example IV.* one number was .75 or 15 s. and the other .0125. or 3 d. and yet the True product of the Multiplication was but .009375. or 2 d $\frac{1}{4}$

The reason is, because 1 being multiplied by 1, can produce but one 1, therefore that which is less than 1 (as are all proper Fractions) being multiplied by that which is less than 1, must needs be Diminished by the Multiplication.

And this Diminution bears the same proportion to the *Multiplicator*, as the *Multiplicand* beareth to the unit whereof it is a part:

For as 15 shillings (*the Multiplicand*) is $\frac{3}{4}$ of a Pound, so 2 d $\frac{1}{4}$ the product is $\frac{1}{4}$ of (*the Multiplicator*) viz. 3 d.

V. Division of Decimals.

Note XIII.

In division of Decimals, the Dividend must sometimes be prepared, by adding a competent

tent number of cyphers to make room for the Divisor.

A General Rule to know the true value of the Quotient.

There must be so many figures cut off in the Quotient, as will make those in the Divisor (if any be) equal to the Number of Decimal parts in the Dividend.

Now this Rule conducing to untie that knot which is generally acknowledged, the most difficult in the whole Doctrine of Decimals, I shall exemplifie it through all the varieties that can happen, and then shew the excellent use thereof in the Art *Metrical*.

Note XIV.

If the Quotient doth not consist of as many places as are required by the general Rule to be cut off, you must supply that defect, by prefixing a Cypher or Cyphers before the Quotient towards the left hand.

Example

Example I.

To divide a whole Number : By a Fraction.

Now there being three Decimal Fractions in the Divisor, and 5 in the Dividend, I therefore cut off 2 in the Quotient to make them equal, so the whole numbers are 1464. and the fraction 28. so here the General Rule is made good.

Example II.

To divide a Fraction : By a whole Number.

Here (according to the XIV Note) I prefix a Cypher before the Quotient, there being after the Division is finished, only 4 figures in the Quotient; so then there are 5 figures in the Dividend, and 5 in the Divisor and Quotient, according to the General Rule.

Example

Example III.

To divide a whole Number and a Fraction : By Fraction.

Here you see 4 figures are cut off, which with the 2 in the Divisor, make 6 equal to the Decimal parts in the Dividend.

$.75)45.275000(60.3666$

Example IV.

To divide a Fraction : By a whole Number and a Fraction.

Here are 7 Decimals in the Dividend, and when the division is finished, 4 figures in the Quotient, which with the 2 in the Divisor make but 6. according therefore to the XIV Note, I prefix a cypher before the 7 to the left hand, and then they are equal.

$12.25).9500000(.07755$

Example. V.

To divide a Fraction : By a Fraction.

According to the general Rule, I cut off or separate 4 figures towards the right hand, which

$.008).8564000(107.0500$

which make those in the Divisor equal to those in the Dividend.

Example VI.

To divide a whole Number and a Fraction: By a whole Number.

Here are only two figures distinguished, (there being none in the Divisor, and 2 only in the Dividend.

Example VII.

To divide a whole Number: By a whole Number and a Fraction.

There being $75 \cdot 85)200.000000(2.63678$
7 Decimals in the Dividend, I therefore cut off 5 in the Quotient, which with 2 in the Divisor make 7. according to the Rule.

Example VIII.

To divide a whole Number and a Fraction: By a whole Number and a Fraction.

According to $3.746)172.500000(46.049$
the XIII Note, I add Cyphers to the Dividend, and finishing the

the Division, I find the Quotient 46049. as in the Margent : Now here, as in all the rest, the General Rule is made good ; for as there are 6 decimal fractions in the Dividend, so cutting off three figures in the Quotient, they make those in the Divisor & also, equal to those in the Dividend.

Thus you see that the preceding Rule will hold good in all the cases that can happen, and is much readier than the old way, and no way burthensome to the memory.

C

M
CHAP.

CHAP. II.

*Shewing the excellent use of Decimals, in
the speedy Mensuration of divers Sur-
pericies and Solids.*

Probl. I.

*Having the Diameter of a Circle: To find the
Area or Superficial Content, either in Square
Inches, or in Wine or Ale Gallons.*

Rule.

Multiply the Square of the Diameter gi-
ven,

By $\left. \begin{array}{l} .785398 \\ .0034 + \\ .0027851 + \end{array} \right\}$ The Product $\left\{ \begin{array}{l} \text{Square Inches.} \\ \text{Wine Gallons.} \\ \text{Ale Gallons.} \end{array} \right.$

Figure

FIGURE I.

*Example 1.*

{ Area of a Circle, whose Dia- }
 meter is Unity ————— } 785398—
 The { Diameter (a.b.) 20 inches }
 { squared ————— } 400

Respon. The Area in Square Inches 314.159200

Example 2.

{ Multiplier for Ale Gallons is .0027851 +
 The { Diameter (a.b.) 20 squared is ————— } 400

Respon. The Area in Ale Gallons 1.1140400

The Converse.

Having the Area of a Circle: To find the Diameter.

Rule.

Multiply the square Inches of the Area given,
 C 2 By

By $\left\{ \begin{array}{l} 1.27324 + \\ 359.0536 - \\ 294.1183 + \end{array} \right\}$ If the Area $\left\{ \begin{array}{l} \text{Square Inches.} \\ \text{Ale Gallons.} \\ \text{Wine Gallons.} \end{array} \right\}$ be given in
The Square Root of the Product is the Diameter.

Example 1.

The $\left\{ \begin{array}{l} \text{Area given in square Inches is } 314.1592 \\ \text{Square of the Diameter of a } \\ \text{Circle whose Area is Unity} \end{array} \right\} 1.27324 +$

Respons. The Square Root $\left\{ \begin{array}{l} \text{is } 20 \text{ the Diameter} \\ \text{is } 400.000059 \text{ \&c.} \end{array} \right\}$

Example. 2.

The $\left\{ \begin{array}{l} \text{Multiplier for Ale Gallon is } 359.0536 - \\ \text{Area in Ale Gallons given is } 1.11404 \end{array} \right\}$

Respons. The Square Root $\left\{ \begin{array}{l} \text{is } 20 \text{ the Diameter } a b \\ \text{is } 400.00183 \text{ \&c.} \end{array} \right\}$

Probl. II.

Having the Diameter of a Circle: To find the Circumference.

Figure 1.

Rule.

Multiply the Diameter by 3.14159265 the Product is the Circumference.

Example.

The $\left\{ \begin{array}{l} \text{Area of a Circle whose Dia-} \\ \text{meter is 2, is} \end{array} \right. \frac{144032}{31415927} \frac{144032}{31415927}$
 Diameter a b given 20 ———— 20

Respons. The Product is the Circumference ———— $\frac{628318530}{31415927}$

The Converse.

Having the Circumference of a Circle: To find the Diameter.

Figure 1.

Rule.

Multiply the Circumference by .31831 + the Product is the Diameter.

Example.

The $\left\{ \begin{array}{l} \text{Circumference given is} \\ \text{Quotient of 1 with Cyphers di-} \\ \text{vided by 3.1415927 is} \end{array} \right. \frac{62.831853}{31415927} \frac{3107102}{31415927}$

Respons. The Diameter is 20 — 20.0000074 &c.

Probl. III.

Having the Circumference of a Circle: To find the Area.

Rule.

Multiply the Square of the Circumference by .079578, the Product is the Area.

C 3

Example.

Figure 1.

Example.

The { Circumference given is } 62.8318 &c. Squared — } 3947.835†
 { Multiplier proper — } .079578

Reſpon. The Product is the Area 314.160813630

The Converse.

Having the Area of a Circle : To find the Circumference.

Rule.

Multiply the Area by 12.5664† the square Root of the Product is the Circumference.

Figure 1.

Example.

The { Area given is } 314.1608†
 { Square of the Circumference } 12.5664†
 { of a Circle whose Area is unity }

Reſponſ. The square Root } 62.8138† is the Circumference } 3947.87027712

Probl. IV.

Having the Axe of a Globe, or Sphere : To find the liquid Content in Square Inches, or in Wine or Ale Gallons.

Rule.

Multiply the Cube of the Axe given by .5236†
 The

The Product is the Liquid Content in Cubick Inches,

Or the $\left\{ \begin{array}{l} 441.1775 \\ \text{Cube of the} \\ \text{Axe divided} \end{array} \right\}$ Half the $\left\{ \begin{array}{l} \text{W. Gal.} \\ \text{Square of the} \\ \text{Gauge point.} \end{array} \right\}$
by $\left\{ \begin{array}{l} 538.5803 \\ \text{or} \end{array} \right\}$ Ale Gal.

Quotes the Content either in Wine or Ale Gallons (according to the question.)

Figure 1.

Example.

$\left\{ \begin{array}{l} \text{Globes Axe } a.b. 20 \text{ inches cubed is } 8000 - \\ \text{The } \frac{1}{2} \text{ of the Area of a Circle whose} \\ \text{Diameter is 2 is } \end{array} \right\} 52364$

Respons. The Content in Cube Inches is 188.8300
Globes Axe cubed
538.5803) 8000.000000 (14.8539 Ale Gallons,
Or more facilly by the Table of Area's,

Rule.

Multiply $\frac{1}{2}$ of the Area of the Circle, belonging to the Axe, by the Axe, the Product is the Liquid Content.

Example.

Ale Gallons.

$\frac{1}{2}$ of the Area belonging to 20 the $\left\{ \begin{array}{l} \text{Axe is } \end{array} \right\}$ 0. 7427
Multiplied by the Axe ———— 20

Respons. The Liquid Content Ale Gal. 14.8540

The Converse.

Having the Liquid Content of a Globe or Sphere,
in Square Inches, or in Wine or Ale Gallons :
To find the Axe ?

Figure 1.

Rule.

The Globes } Inches divide by ————— 52364
Liquid Con- }
tent given in } Wine } Gallons mul- } 441. 1775
Ale } tiplly by } 538. 5803
The Cube Root of the Quotient or Product
is the Axe sought.

Example.

The Globes Liquid } Ale Gal. &c.
Content given is } 14. 8530.
The proper Multiplier is } 538. 5803.

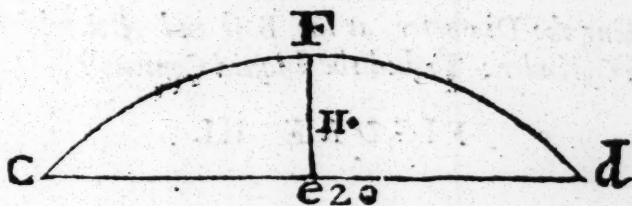
Whose Cube Root 20 is the } 8000. 01791817
Axe a. b. ————— }

Prob.

Probl. V.

Having the Altitude of the Frustum of a Globe or Sphere, and Diameter of its Base: To find the Liquid Content in Ale Gallons Arithmetically, applicable for measuring the Crown of a Brewers Copper.

FIGURE II.



Rule.

- I. Square the Diameter at the Base.
- II. Multiply the Quotient by $\frac{1}{2}$ the Frustum's Altitude.
- III. Divide the last Product by 359.0536 the Quotient is the Content in Ale Gallons.

Example.

The Square of the Diameter at the Base }
c.d. 20 Inches is _____ } 400

Multiplied by $\frac{1}{2}$ the Altitude *e. F. viz.* -- 5.5

The Product 2200.0

359.0536)2200.0000000(6.127 Ale Gal-
 lons the Content.

Or

[26]

Or you may find the Content by the Table
of *Area's* more readily thus :

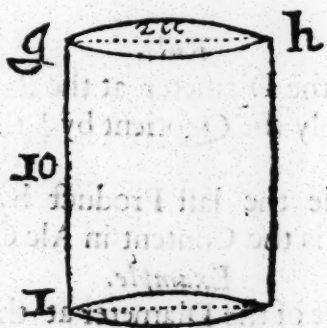
The Diameter of the } Ale Gal. &c.
Frustum's Base 20 is } 1. 1140
Multiplied by $\frac{1}{3}$ the Crowns Altitude 5.5

Respons. The Content ————— 6. 12700

Probl. VI.

*Having the Diameter at the Base and Altitude of
a Cylinder : To find the Liquid Content ?*

FIGURE III.



Rule.

Divide the Square } 294. 1183 } for } Wine } G.
of the Diameter at } } } Ale }
the Base by } 359. 0536 }

Or multiply the Square } 5.00344 }
10 of the Diameter by } 0.00278514 }

The

The Quotient or Product is the Content Inch deep, which multiplied by the Altitude, produceth the whole Liquid Content.

Example.

g.b. The Diameter of the Base 100 squared is Ale Gallons.

359.0536) 40000. 0000000 (111.404 &c.

Multiplied by *g. 1.* the Altitude or Depth 10

The Product is the whole Liquid Content of the Cylinder in Ale Gallons—1114.040 Being triple to the Content of a Cone of the same Base and Altitude.

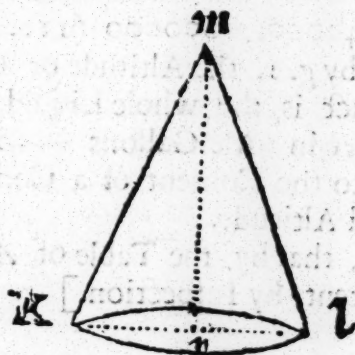
[And note, that by the Table of *Area's* you have the Content by Inspection.]

Prob.

Probl. VII.

Having the Diameter of the Cone's Base and Altitude : To find the Liquid Content.

FIGURE IV.

*Rule.*

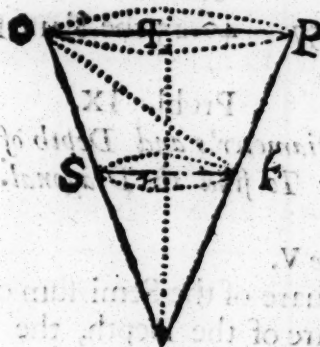
Multiply the Square of the Diameter at the Base by $\frac{1}{3}$ of the Cones Altitude ; and divide the Product by 294. 1183 for Wine Gallons, by 359. 0536 for Ale Gallons, by 11489. 715 for Ale Barrels, and by 12925. 93 for Beer Barrels, the Quotient is the whole Content.

Example.

k. l. The Diameter 130 squared is — 16900
Multiplied by $\frac{1}{3}$ of the Altitude *m. n.* — 10
Ale Gallons.
359. 0536 } 169000. 0000000 (470. 682.
Prob.

Having the Diameters and Depth of the Frustum
of a Cone : To find the Slant Height or Hypo-
thenusal.

FIGURE V.



Rule.

To the Square of the Depth, add the Square of
the Semi-difference of the Diameters, the square
Root of the sum is the Slant Height sought.

Example.

There is a Conical Tun whose Dimensions are,

o. p. Diam. Top. 144

f. t. Diam. Bot. 108 } Inches.

Diff. 36

And *q. r.* the Depth 36. the $\frac{1}{2}$ is 18

18

Squared 324

q. r.

[30]

q. r. The Depth 36 Squared is 1296
 Semi-difference of Diam. 18 Squared is 324
 Log. 3. 209515. 1620

Inches.

1. 604757. — 40.25 the Slant Height O. S.

Probl. IX.

Having the Diameter's and Depth of the Frustum
 of a Cone : To find the Diagonal.

Figure V.

Rule,

To the Square of the Semi-sum of Diameters,
 add the Square of the Depth, the Square Root
 of the Sum is the Diagonal.

Example.

The Semi-sum of the Diameters 126 } 15876
 squared is —————
 q. r. The Depth Squared is 1296
 Whole Square Root 131. 042 is } 17172
 the Diagonal or —————

Prob.

Probl. X.

Having the Diagonal and Diameters of the Frustum of a Cone : To find the Depth.

Figure 5.

Rule.

From the Square of the Diagonal, subtract the Square of the Semi-sum of Diameters, the Square Root of the Remainder is the Depth.

Example.

v. t. The Diagonal given is 131. 0423 } squared is 17172

The Semi-sum of the Diameters 126 } squared is 15876

Whose Square Root 36 is the Depth q. r. 1296

Probl. XI.

Having the Diagonal, Depth, and Hypotenusal or Slant Height : To find the Diameters.

Rule.

I. From the Square of the Diagonal, subtract the Square of the Depth, the Square-Root of the Remainder is the Semi-sum of Diameters.

II. The Square Root of the Difference of the Squares of the Depth and Slant Height, is the Semi-difference of Diameters.

III. The Semi-sum of Diameters, more their Semi-difference, is the greater Diameter, and the Semi-

Semi-sum less, the Semi-difference, is the *lesser* Diameter.

Example:

I.

o. s. The Diagonal 131.042. squared is 17172

q. r. The Depth 36 squared is 1296

Whose Sq. Root is 126 the Semi-sum 15876

II.

Square of *o. s.* the Slant Height — 1620

Square of *q. r.* the Depth — 1296

Whose Square Root is 18 — 324

The Sem difference of Diameters

The Semi-sum of Diameters is 126. add and
Subtract 18 the Semi-difference of Diameters.

So the Diameters are { 144 Diameter at Top. *o. p.*
 { 108 Diameter at Bott. *s. r.*

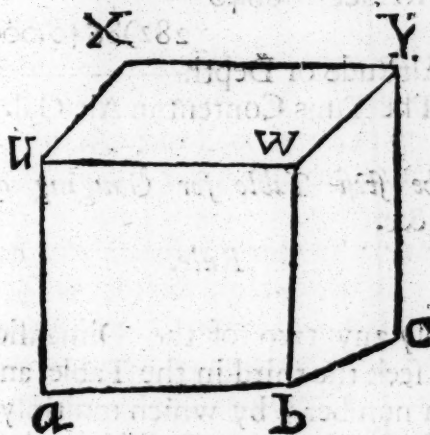
CHAP. III.

*How to Gauge Square or Round Tuns,
with other Vessels belonging to the
Brewers, as Backs, Coppers, Flotes, &c.
either in the whole, or gradually from
inch to inch Arithmetically, and by De-
cimal Tables.*

Prob. I.

How to Gauge an upright Square Tun.

FIGURE VI.



I. *Arithmetically.*

Rule.

HAVING taken the length, breadth and depth
in inches, &c.

D

Mul-

Multiply the length by the breadth,
 And divide $\left\{ \begin{array}{l} 282 \\ 9024 \\ 10153 \end{array} \right\}$ The Quotient $\left\{ \begin{array}{l} \text{Ale Gal.} \\ \text{is the Content} \\ \text{inch-deep in} \end{array} \right\}$ Ale Gal.
 the Pro- $\left\{ \begin{array}{l} 282 \\ 9024 \\ 10153 \end{array} \right\}$ is the Content $\left\{ \begin{array}{l} \text{Ale Barrels.} \\ \text{Beer Bar.} \end{array} \right\}$
 duct by $\left\{ \begin{array}{l} 282 \\ 9024 \\ 10153 \end{array} \right\}$ inch-deep in $\left\{ \begin{array}{l} \text{Ale Gal.} \\ \text{is the Content} \\ \text{inch-deep in} \end{array} \right\}$ Beer Bar.

Which multiplied by any given Depth, produces the Content of the whole Tun.

The $\left\{ \begin{array}{l} \text{Length } x, y. = 144 \text{ inches} \\ \text{Breadth } u, w. = 60. \end{array} \right\}$ And Depth $x.$
 $\left\{ \begin{array}{l} \text{Length } x, y. = 144 \text{ inches} \\ \text{Breadth } u, w. = 60. \end{array} \right\}$ $\left\{ \begin{array}{l} \text{And Depth } x. \\ u. 40 \text{ inches.} \end{array} \right\}$
 Ale Gallons.

The Product 8640

282)8640.000(30.638

The Altitude or Depth ——— inches 40
 Resd. The Tuns Content in Ale Gal. 1225.520

II. By the *first Table for Gauging of Square Tuns, &c.*

Rule.

Multiply any two of the Dimensions together, and seek the third in the Table, and against it stands a number; by which multiply the former Product, and you shall have the Content either in Ale Gallons, or in Ale or Beer Barrels, according to the Multiplier made use of.

Example.

Example.

Against 40 the Depth in the Collumn } .14185
for Gallons, Stands _____ }
144 Multiplied by 60, produces — 8640

567400
85110
113480

Resp. The liquid Content in Ale Gal. 1225.58400
Cutting off 5 Figures from the Product towards the right hand, according to the Doctrine of Decimals.

And though the Table be only calculated to whole Inches, yet forasmuch as the differences are equal, the intermediate parts may easily be found, if you turn your Vulgar Fraction into a Decimal; thus —

To find the Tabular number correspondent to $98 \frac{1}{2}$ inches, or 98.75 dicimally.

Against 98 stands .34752, to which add .266 the number against .75 cutting off 2 figures, and the sum .35018 is the number required: And if the number of Inches proposed be more than is expressed in the Table, then take the number against half the inches given and double it, and you have your desire.

III. By the Second Table for Square Tuns, &c.
pag.

And thus you may Gauge a Tun consisting of equal Elliptical Bases, by help of the Table of *Area's* of Circles.

Rule.

Enter the Table of Roots with the Breadth and Length, or Tranverse and Conjugate Diameters, and in the common Angle you have a Geometrical Mean Proportional between them ; or if you have not such a Table ready calculated, multiply the two given Numbers together, and out of the Product extract the Square Root ; so is your Tun reduced either to a Square or a Round (according to the tenour of the Question :) Then with this Mean enter the proper Table, and take out the *Area* correspondent, which multiplied by the given Altitude or Depth, produces the Tuns whole Content.

Example.

60 Inches at top, and 144 in the side, gives in the common Angle 92.95 Inches.

Ale Gallons

92.95 Inches gives per Table = 30.64

Altitude or Depth ————— 40

Respon. Tun Content in Ale Gallons — 1225.60

Probl.

How to Guage a Tun, consisting of two Unequal Quadrangular Bases, but Equal sides at each Base.

Follow the general Rule, *page 45.* for the Regular Poligons, one third part of the Sum is the Solid Content in Cubical Inches.

Or divide $\left\{ \begin{array}{l} 846 \\ 27072 \\ 30456 \end{array} \right\}$ The Quotient $\left\{ \begin{array}{l} \text{Ale Gal.} \\ \text{is the Content} \\ \text{Inch-deep in} \end{array} \right\}$ Ale Bar. Beer Bar.

Which multiply by any given Depth, the Product is the whole Liquid Content of the Tun.

And these Divisors are three times the Cubical Inches in an Ale Gallon, Ale and Beer Barrel.

I. *Arithmetically.*

Example.

There is a Pyramidal Tun, consisting of two unequal Quadrangular Bases, but equal sides at each Base: the four sides above, *viz. u.x: x.y.* each 100 Inches; the four sides below, *viz. a.b: b.c.* each 78 Inches, and the Altitude *w.b.* 22 Inches. How many Ale Gallons doth this Tun contain upon an Inch, and what is the whole liquid Content?

D 3

4 Sides

[38]

$\left. \begin{array}{l} \text{+ Sides} \\ \text{Above } x. x. y. \\ \text{Below } a. b. b. c. \end{array} \right\} \text{each} \left\{ \begin{array}{l} 100 \\ 78 \end{array} \right\} \begin{array}{l} \text{Inches} \\ \text{Squar.} \\ \text{is} \end{array} \left\{ \begin{array}{l} 10000 \\ 6084 \\ 7800 \end{array} \right.$
 Rectangle of 100 and 78 is ——— 7800

Sum 23884

Ale Gallons

846) 23884.00 (28.23
 Altitude or Depth *m. b.* ——— Inches 22
 5646
 5646

Respons. The Content in Ale Gallons 621.06

II. By

II. By the Second Table for Square Tuns, &c.
 pag. operating according to the Rule for a
 Conical Tun pag. (145)

4 Sides at $\left\{ \begin{array}{l} \text{Top each} \\ \text{Bottom} \end{array} \right. \begin{array}{l} 100 \\ 78 \end{array} \text{ Inches.}$

Sum = 178 Ale Gallons.

$\frac{1}{2}$ = 89 Inches,
 by the Table 28. 09
 gives ————

11. Semi-difference of Squares 0. 43 }
 whose $\frac{1}{2}$ is ———— } 0 .14

The Sum is a Mean Area ———— 28.23
 Multiplied by Altitude or Depth is Inches 22

Reffans. Tuns Content in Ale Gallons 621 .06
 (i. e. 17 Beer Bar. 1 Firke. 0 Gal. $\frac{1}{2}$ ferè.)

Now by this Table it is easily inched, fol-
 lowing the directions for a Conical Tun.

Probl. III.

How to Gauge a Square Tun, consisting of unequal
 Bases, and unequal Sides, or a Tun consisting of
 unequal elliptical Bases.

I. Arithmetically.

1. To the Length or Transverse Diameter
 D 4 above

above, add half the Length, or Transverse Diameter *below*, and multiply the Sum by the Breadth, or Conjugate Diameter *above* (*reserving the Product.*)

II. To the Length or Transverse Diameter *below*, add half the Length or Transverse Diameter *above*, and multiply the Sum by the Breadth, or Conjugate Diameter *below* (*reserving the Product.*)

	Square	Round
III. The sum	846	1077.161
of these two pro-	27072	34469.145
ducts divided by	30456	38777.779
	for square	or by

The Quote is the
 Content of Inch-deep { Ale Gallons.
 in ————— { Ale Barrels.
 { Beer Barrels.

Which multiplied by any given Altitude or Depth, produces the Content at that Altitude in Ale Gallons, or in Ale or Beer Barrels (*according to the Divisor made use of.*)

Examples.

Length { Above *n. x* = 200 inches.
 { Below $\frac{1}{2}$ *a. b* = 85

Sum ——— 285

Breadth Above *x.y.* ——— 160

1. Product ——— 45600

Length

[41]

Length $\left\{ \begin{array}{l} \text{Below } a. b. = 170 \text{ inches.} \\ \text{Above } \frac{1}{2} u. x. = 100 \end{array} \right.$

Sum — 270

Breadth below $b. c. = 130$

2. Product — 35100

1. Product — 45600

Sum 80700

Ale Gallons upon an Inch.

846) 80700.000. (95.39.

Altitude or depth — 20 Inches.

Resp. Tuns Content 1907.80 Ale Gallons.

(i.e. 52 Beer Bar. 3 Firks 8. $\frac{1}{4}$ Gallons propè.)

Ale Gallons upon an Inch.

1077.161) 80700.0000 (74.92

Altitude or Depth — 20 inches.

Respons. Tuns whole Content 1598.40

Note.

If the Sides are Proportional, it is a Frustum of a Pyramid, or Cone: if they be Disproportional, it is called a Prismoid, or Cylindroid; and if one Base be a rectangl.d Parallelogram, and the other a Square; or one an Ellipsis, and the other a Circle, it is gauged after the same manner.

II. By

II. By the second Table for Square Tuns, &c. and by the Table of *Area's* of Circles, they may more readily be gauged, by finding two Geometrical mean Proportionals between the lengths and breadths, or transverse and conjugate Diameters at Top and Bottom after this manner.

Enter the Table of Roots with the Dimensions at Top of the Tun, and in the common Angle you have the Mean required ; do the same for the Bottom, so have you the two ends of the Tun reduced to a Square, or a Circle ; then finish the work as directed for a Pyramidal Square Tun, or a Conical Tun, *pag.*

Example.

Bread.	Length	
160 } inch.	200 }	gives in the { 178.9 }
130 } by	170 }	common Ang. { 148.6 }
		Inches.
		Sum = 327.5
		$\frac{1}{2}$ = 163.75 Inches

Ale Gallons.

163.75 Inches *per* Table gives ————— 95.10

15 Semi-difference of Squ. 0.80 whose $\frac{1}{2}$ is 0.27

The Sum is a Mean *Area* ————— 95.37

Altitude or Depth is ————— Inches 20

Respons. Liquid Content in Ale Gallons 1907.40

(i. e.) 52 Bar. 3 Firks 8 Gal. $\frac{1}{2}$ ferè of Beer.

Ale Gallons.

163.75 Inches per Table of *Area's* gives—74.68
 15 Semi-difference of Diam. 0.65 the $\frac{1}{3}$ is 00.22

Sum is the *Area* of a Mean Circle——74.90
 Altitude or Depth is——Inches 20

Ale Gall.

Reffons. The Tuns Liquid Content 1598.00

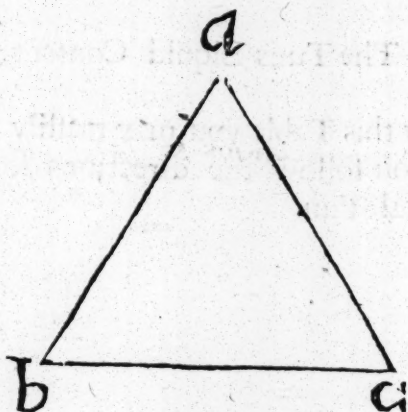
Now by this Table you may readily inch this
 Tun, if you follow the directions for inching
 an Elliptical Tun.

Probl.

Probl. IV.

How to Gauge a Triangular Solid, whose Sides Above and Below are Equal.

FIGURE VII.



Rule.

— Multiply the Square of half a side by 1.732051— (*the Square Root of 3*) the Product is the *Area* in Square Inches.

The Square of half a side { 162.813 } the Quotient } Ale G.
 divided by { 5210.010 } is the content } Ale B.
 { 5861.264 } Inch-deep in } Beer B.

Which multiplied by any given Depth, produces the Tuns whole Content at that Altitude.

And

And these Divisors are made by dividing 282
(the Cubical Inches in an Ale Gallon) 9024 (the
Cubical Inches in an Ale Barrel) and 10152 (the
Cubical Inches in a Beer Barrel) severally by
1.732051—

Example.

There is an *Æquilateral Triangular Tun*, whose
Bases are Equal, each 140 Inches: How many Square
Inches doth this Tun contain? also how many Gal-
lons doth it hold upon an Inch? and if it be 20
inches Deep, what is the whole Content?

The Square Root of 3 is ——— 1.732051—
70 Inches, $\frac{1}{2}$ a side Squared, is ——— 4900

1558845900
6928204

Respon. The Content in Squ. Inches 8487.049900

But if the Tun be *Pyramidal* (i.e.) the Bases
Unequal, follow this General Rule, which will
hold good in all the Ten Regular Polygonal So-
lids.

Rule.

- I. Square the Sides of the Greater and
Lesser Base, severally.
- II. Multiply them one into another.
- III. Add the three sums together.

And

And di-
vide the
Total by

6.928203
1953.756
62520.120
70355.144

The Quoti-
ent is the
Content
Inch-deep in

Inches
Ale G
Ale B.
Beer B

Which multiplied by any given Depth, the Product is the Tuns whole Content.

And these Divisors are found by multiplying the preceding Numbers, viz. 162.813 for Gallons, and the rest severally by (12)

And the Divisor for Inches is 4 times the Square Root of (3.)

Example.

There is an Æquilateral Pyramidal Tun, consisting of Unequal Bases, the 3 Sides at Top each 200 Inches, the 3 Sides at Bottom each 140 Inches, and the Altitude or Depth 40 Inches: How many Ale Gallons doth this Tun contain?

The	{	Square of 200 the sides Above	—	40000
		Square of 140 the sides Below	—	19600
		Rectangle of the two Bases	—	28000
		Sum	—	87600
Altitude or Depth is		—	Inches 40	
Product		—	350400	
				1953.

[47]

1953.756)350400.00000(179.34

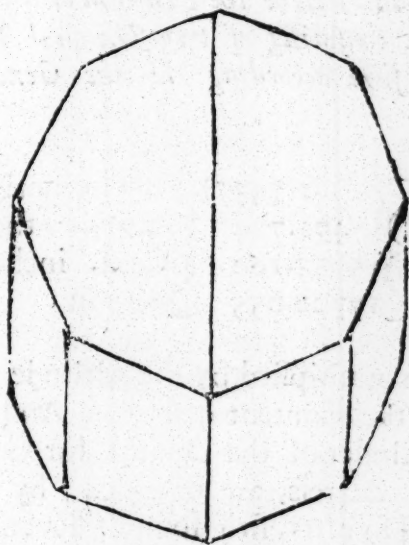
Ale Gallons.

Respons. The Tuns whole Content 179.34.

Probl. V.

How to Gauge a Tun in form of a Pentagonal Solid, whose Sides Above and Below are Equal.

FIGURE VIII.



Rule.

Multiply the Squire of a side by 1.720478. the Product is the *Area* in Square Inches.

The

The Square } 163.908 } The Quotient } Ale G.
of a Side di- } 5245.054 } is the content } Ale B.
vided by } 5900.685 } Inch-deep in } Be. B.

Which multiplied by the Altitude or Depth, produces the Tuns whole Content.

And these Divisors are found by dividing 282, 9024, and 10152 severally, by 1.720478.

But if the Tun be the Frustum of a Pentagonal Pyramid, consisting of two Unequal Bases, then find the sum according to the General Rule, pag. 45.

Which } 1.7437† } The Quoti- } Inches
sum be- } 491.724 } ent is the } Ale G.
ing divi- } 15735.162 } Cont. inch- } Ale B.
ded by } 17702.055 } deep in } Beer B.

Which multiplied by the Altitude or Depth, produces the Content desired. And these and the Remainder of the Divisors for Gallons, Ale and Beer Barrels, are obtained, by multiplying the Divisors first found, severally by 3. And the Divisors for Inches are gained by dividing a Unite, or 1 with Cyphers, by one third part of the several Multipliers for Inches.

Probl.

Probl. VI.

How to Gauge a Tun in form of an Hexagonal Solid, the Sides Above and Below Equal.

Rule.

Multiply the Square of a Side by 2.59876. the Product is the *Area* in Square Inches.

The Square of a Side divided by $\left. \begin{array}{l} 108.542 \\ 3472.425 \\ 3907.506 \end{array} \right\}$ the Quotient is the content } Ale G.
 Ale B.
 Inch deep in } Beer B.

Which multiplied by the Depth enquired of, produces the Tuns whole Content.

And these Divisors are found by dividing 282.9024. and 10152 severally, by 2.59876.

But if the Tun be the Frustum of an Hexagonal Pyramid, consisting of two Unequal Bases — Then observe the general Rule, pag. 45.

And divide the reserved Sum by $\left. \begin{array}{l} 1.1544 \\ 325.625 \\ 9417.275 \\ 11722.518 \end{array} \right\}$ The Quotient is the } Inches.
 Ale G.
 Cont. inch } Ale B.
 deep in } Beer B.

Which multiplied by the given Depth, produces the whole Content.

Probl. VII.

How to Gauge an Heptagonal Solid, whose Sides Above and Below are Equal.

Figure 8.

Rule.

Multiply the Square of a Side by 3.634644; the Product is the Area in Square Inches.

The Squa.	{	77.5867	{	The Quot. is the	{	Ale G.		
of a Side						2482.775	Cont. upon each	Ale B.
divided by						2793.121	Wet Inch in	Beer B.

Which multiplied by the Depth, produces the Content at that Altitude. And these Divisors are made by dividing 282,9024, and 10152 severally, by 3.634644.

But if the Tun be the Frustum of an Heptagonal Pyramidal Solid, consisting of two Unequal Bases, Then ——— follow the General Rule, page 45.

And di-	{	.82539—	{	The Quot. is the	{	Inches		
vide the						232.7601	Cont. upon each	Ale G.
reserved						7448.325	wet Inch in	Ale B.
Sum by						8379.363		Beer B.

Which multiplied by the Depth, produces the Content desired.

Probl.

Probl. VIII.

How to Gauge a Tun in form of an Octogonal Solid, whose Sides Above and Below are Equal.

Rule.

Multiply the Square of a Side by 4.828427, the Product is the *Area* in Square Inches.

The Squ. of a Side { 58.404 } The Quo. is the } Ale G.
 { 1868.932 } Cont. upon each } Ale B.
 divid. by { 2102.551 } wet Inch in } Beer B

Which multiplied by any given Depth enquired of, produces the Content at the Altitude of Liquor sought.

And these Divisors are made by dividing 282.9024. 10152 severally, by 4.828427.

But if the Tun be an Octogonal Pyramidal Solid, consisting of two Unequal Bases—Then observe the General Rule, page 45.

And divide the referred Sum by — { .6213202 } { 175.212 } { 5606.796 } { 6307.653 } { The Quot. is } { the Content } { Inch-deep in } { Inches. } { Ale G. } { Ale B. } { Beer B.

Which multiplied by the Altitude, produces the Content.

Probl. IX.

How to Gauge a Nonagonal Solid, whose Sides Above and Below are Equal.

Figure 8.

Rule.

Multiply the Square of a Side by 6.181904 the Product is the *Area* in Square Inches.

The Squ. of a Side divided by $\left\{ \begin{array}{l} 45.617 \\ 1459.744 \\ 1642.233 \end{array} \right\}$ The Quot. is $\left\{ \begin{array}{l} \text{Ale Gal.} \\ \text{the Cont. by Ale Bar.} \\ \text{Inch deep in Beer Ba.} \end{array} \right\}$

Which multiplied by any Depth, produces the Tuns Content at that Altitude.

And these Divisors are found by dividing 282. 9024. 10152 severally, by 6.181904.

But if the Tun be the Frustum of a Nonagonal Pyramid, consisting of two Unequal Bases — Then observe the General Rule, page (15.)

And divide the referred sum by $\left\{ \begin{array}{l} .4852884 \\ 136.851 \\ 4379.232 \\ 4926.669 \end{array} \right\}$ The Quot. is $\left\{ \begin{array}{l} \text{Inches} \\ \text{the Content Ale G.} \\ \text{Inch deep in Ale B.} \\ \text{Beer B} \end{array} \right\}$

Which multiplied by the Depth, the Product is the Content.

Probl.

Probl. X.

How to Gauge a Tun in form of a Decagonal Solid, whose Sides Above and Below are Equal.

Figure 8.

Rule.

Multiply the Square of a Side by 7.694197, the Product is the *Area* in Square Inches.

The Square of a Side divided by $\left\{ \begin{array}{l} 36.651 \\ 1172.832 \\ 1318.139 \end{array} \right\}$ The Quot. is $\left\{ \begin{array}{l} \text{Ale G.} \\ \text{the Content} \\ \text{inch-deep in} \end{array} \right\} \left\{ \begin{array}{l} \text{Ale G.} \\ \text{Ale B.} \\ \text{Beer B.} \end{array} \right.$

Which multiplied by any Depth, produces the Content at that Altitude.

And these Divisors are found by dividing 282. 9024. 10152 severally, by 7.694197.

But if the Tun be the Frustum of a Decagonal Pyramid, consisting of two Unequal Bases: Then — observe the General Rule, page (45.)

And divide the referred Sum by $\left\{ \begin{array}{l} .389897 \\ 109 .953 \\ 3517 .499 \\ 3954 .408 \end{array} \right\}$ The Quot. is $\left\{ \begin{array}{l} \text{Inches.} \\ \text{the Content} \\ \text{on each wet} \\ \text{Inch in} \end{array} \right\} \left\{ \begin{array}{l} \text{Ale G.} \\ \text{Ale B.} \\ \text{Beer B.} \end{array} \right.$

Which multiplied by the Altitude, the Product is the Content.

Probl. XI.

How to Gauge a Tun in form of an Hendecagonal Solid, whose Sides Above and Below are Equal.

Figure 8.

Rule.

Multiply the Square of a side by 9.365659, the Product is the *Area* in Square Inches.

The Square of a Side divided by $\left\{ \begin{array}{l} 30.110 \\ 963.520 \\ 1083.962 \end{array} \right\}$ The Quot. is } Ale G.
the Content } Ale B.
inch-deep in } Beer B

Which multiplied by the Depth, produces the whole Content.

And these Divisors are made by dividing 282. 924. and 10152 severally, by 9.365659.

But if this Tun be the Frustum of an Hendecagonal Pyramidal Solid, consisting of two Unequal Bases : Then — observe the General Rule, pag. 45.

And divide the referred Sum by — $\left\{ \begin{array}{l} .3203192\frac{1}{2} \\ 90.330 \\ 2890.560 \\ 3251.833 \end{array} \right\}$ The Quot. is } Inch.
the Content } Ale G.
Inch-deep } Ale B.
in ————— } Bee. B.

Which multiplied by any given Depth enquired of, produces the Content at that Altitude.

Probl.

Probl. XII.

How to Guage a Tun in form of a Dodecagonal Solid, whose Sides Above and Below are Equal.

Figure 8.

Rule.

Multiply the Square of a Side by 11.196252; the Product is the *Area* in Square Inches.

The Square of a Side divided by $\left\{ \begin{array}{l} 25.187 \\ 805.985 \\ 906.732 \end{array} \right\}$ The Quot. is $\left\{ \begin{array}{l} \text{Ale Gal.} \\ \text{the Content} \\ \text{inch-deep in} \end{array} \right\}$ Ale Bar. Beer Bar.

Which multiplied by the Depth, the Product is the Content.

And these Divisors are made by dividing 282.9024.10152 severally, by a 11.196252.

But if this Tun be the Frustum of a Dodecagonal Pyramidal Solid, consisting of two Unequal Bases: Then—observe the General Rule, pag. 45.

And divide the referred Sum by $\left\{ \begin{array}{l} .2679491 \\ 75.561 \\ 2417.949 \\ 2720.196 \end{array} \right\}$ The Quo. is $\left\{ \begin{array}{l} \text{Inches.} \\ \text{the Content} \\ \text{on each wet} \\ \text{Inch in} \end{array} \right\}$ Ale G. Ale B. Beer B.

Which multiplied by any given Altitude or Depth, produces the Tuns whole Content (according to the Divisor made use of.)

Probl. XIII. .

Having the Side and Depth of a Tun in form of any of these Ten Polygonal Figures; To find the Diameter, the Sides Above and Below being Equal.

Rule.

I. Multiply the Inches in each Side by the Number of Sides, the Product is the *Perimeter*.

II. Find the *Area* of the Base in Square Inches, by multiplying the Square of a Side, by the Multiplier proper to the given Figure.

III. Divide the Square Inches found by one fourth of the *Perimeter*, the Quotient is the *Diameter* required.

Example.

There is an Octogonal Solid, whose Sides Above and Below are each 50 Inches.

Sides— 50
The Number of Sides — 8

Product is the *Perimeter* — 400
The one fourth part is — 100

Mul-

Multiplicator proper for an Octo-
gonal Solid is ————— 4.828427

50 The Side Squared, produces ————— 2500

2414213500

9656854

The Product is the *Area* }
in Square Inches ————— } 12071.067500

The Diameter sought
100) 12071.0675 (120.7106

*A General Rule for Inching any of the Ten Poly-
gonal Pyramidal Solids, from the Lesser Base
to the Greater.*

I. Divide the *Difference of the Sides* of the
Greater and Lesser Base, by the *Altitude or Depth*,
the *Quotient* sheweth how much the *Lesser Side*
encreaseth at 1 Inch distance, either upwards or
downwards, which reserve for a common *Addend*.

II. To three times the Square of the *Lesser*
Base's Side, add 3 times that Side, and *Addend*
multiplied by the *Addend*.

The sum is the tripled Content in Cubical
Inches, which divided by the Divisor (*proper to*
the Figure and Tenour of the Question) quotes
the

the Tuns *first Frustum* (i. e.) the Content upon the first Inch from the *Lesser Base*.

III. To 3 times the Square of the *Lesser Base's Side*, add 9 times that Side, and 7 times the *Addend*, multiplied by the *Addend*.

The sum divided by the proper Divisor, quotes the *first Difference* (i. e.) the Tuns Content upon the next Inch from the *Lesser Base*.

IV. The sum of 6 times the Side of the *Lesser Base*, and 12 times the *Addend*, multiplied by the *Addend*, and the Product divided by the proper Divisor, quotes the *second Difference*.

V. Six times the Square of the *Addend* divided by the proper Divisor, quotes the *third Difference*, which varies not, but is the same throughout the work.

Then proceed with the *third Differences* to make the *second* and *first* for every Inch of Depth by *Addition*, and consequently the Table it self.

A General Rule for Inching any of the Ten Polygonal Pyramidal Solids, from the Greater Base to the Lesser.

Rule.

I. Divide the *Difference of the Sides* of the Greater and Lesser Base, by the *Altitude* or Depth, the *Quotient* sheweth how much the *Greater Side* decreaseth at 1 Inch distance, either upwards

upwards or downwards, which reserve for a common *Subducend*.

II. From 3 times the Square of the *Greater Base's Side*, subtract 3 times that Side, less the *Subducend* multiplied by the *Subducend*.

The Remainder is the tripled Content in Cubical Inches, which divided by the Divisor (*proper to the Figure and Tenour of the Question*) quotes the Tuns *first Frustrum* (i.e.) the Content upon the first Inch from the *Greater Base*.

III. From 3 times the Square of the *Greater Base's Side*, subtract 9 times that Side, less 7 times the *Subducend*, multiplied by the *Subducend*.

The Remainder divided by the proper Divisor, quotes the *first Difference* (i.e.) the Tuns Content upon the next Inch from the *Greater Base*.

IV. From 6 times the Side of the *Greater Base*, subtract 12 times the *Subducend*, the Remainder multiplied by the *Subducend*, and the Product divided by the proper Divisor, quotes the *second Difference*.

V. Six times the Square of the *Subducend*, divided by the proper Divisor, quotes the *third Difference*, which is the same throughout the work.

And note, that (*in this case*) the third Difference is to be continually subtracted from the second, and the second from the first; and the
first

first Difference so corrected, to be added to the first *Frustum*, and so on to every Inch of the Tuns Depth.

After the same manner you may Inch a Conical Tun from the Greater or Lesser Diameter, using the Divisors for the *Frustum* of a Cone, *Prob. XIV.* But the best way is to Inch it by the second Table for Square Tuns, observing the same Method, as directed in Inching a Conical Tun by the Tables of *Area's* of Circles.

Probl. XIV.

How to find the Liquid Content of the Frustrum of a Cone, which may well represent a Brewer's Round tapering Tun.

Rule.

I. Arithmetically.

I. Square the Diameters at Top and Bottom severally.

II. Multiply the two Diameters one into another.

III. Add the three sums together.

And divide $\left\{ \begin{array}{l} 1077.161 \\ 34479.145 \\ 38777.779 \end{array} \right\}$ The Quot. is $\left\{ \begin{array}{l} \text{Ale G.} \\ \text{Ale B.} \\ \text{Beer B.} \end{array} \right\}$
it by ——— deep in

Which

Which multiplied by the Altitude or Depth,
the Product is the Content (according to the
Divisor made use of.)

Figure 5.

Example.

There is a Conical Tun, whose Diameter at Top
is O.P. 144 Inches : Diameter at Bottom S. t. 108
Inches, and Altitude q.r. 36 Inches : How many
Ale Gallons shall this Tun contain ? and how many
upon an Inch ?

O. P. Diameter at Top squared is ——— 20736

S. t. Diameter at Bottom squared is — 11664

Rectangle of 144 and 108 is ——— 15152

Sum ————— 47952

Ale Gallons upon an Inch.

1077. 61) 47952.00000 (44.52

Altitude or Depth ——— ——— ——— Inches 36

26712

13356

Respons. Tun's whole Content — 1602. 72

H. By

II. By the Table of Area's.

Rule.

Seek the Number in the Table against half the sum of the Diameters, to which add $\frac{1}{2}$ of the Number against the Difference of Diameters, or $\frac{1}{3}$ of the Number against the Semi-difference of Diameters; the sum is the Area of a Mean Circle; which multiplied by the Altitude, or Depth given, produces the Liquid Content at the Altitude inquired of.

Example

Diameter { Top O. P. 144 }
 at ——— { Bottom S t. 108 } Inches.

Altitude 36 Inches.

Sum ——— 252 Ale Gallons
 $\frac{1}{2}$ ——— -126 per Table gives 44.22
 18 Semi-difference of Diameters 0.90 }
 whose $\frac{1}{3}$ is ——— 0.30

Sum is the Area of a mean Circle — 44.52

Altitude or Depth Inches — 36

267 12
 13356

Respon. Tuns whole Content Ale Gal. 1602.72

A General Rule for Inching any Square Tun, consisting of Unequal Sides, and Unequal Bases; or a Tun consisting of Unequal Elliptical Bases from the Lesser Base.

I. Divide the *Difference* of the two Lengths (if it be a Square) or of the two Transverse Diameters (if it be an Ellipsis) by the Altitude or Depth, the Quotient is a Number, which call *D*.

Divide also the *Difference* of the two Breadths, or of the two Conjugate Diameters (according to the Tenour of the Question) by the Altitude or Depth, the Quotient is a Number, which call *d*.

II. To three times the *Lesser Length*, or *Lesser Transverse Diameter*, add $1 \frac{1}{2} D$. and multiply the Sum by the *Lesser Breadth*, or *Lesser Conjugate Diameter* (reserving the Product.)

Then to $1 \frac{1}{2}$ the *Lesser Length*, or *Lesser Transverse Diameter*, add the Number *D*. and multiply the Sum by *d*. and unto the Product add the reserved Product.

The sum $\left\{ \begin{array}{l} 846 \\ 27072 \\ 30452 \end{array} \right\}$ For Squ. quotes $\left\{ \begin{array}{l} \text{Ale Gal.} \\ \text{the Cont. of the} \\ \text{first Frustum in} \end{array} \right\}$ Ale Barrels.
divided by ——— Beer Barr.

(Accord-

(According to the purport of the Question) (i.e.)
the Content upon the first Inch from the Lesser
Base.

Or the $\left\{ \begin{array}{l} 1077.161 \\ 34479.145 \\ 38777.779 \end{array} \right\}$ for Round quotes } Ale G.
Sum di- } the Cont. of the } Ale B.
vided by } I. Frustum in — } Be. B.

III. To 3 times the Lesser Length, or Lesser Transverse Diameter, add $4\frac{1}{2}$ times D. and multiply the Sum by the Lesser Breadth, or Lesser Conjugate Diameter (reserving the Product.)

Then to $4\frac{1}{2}$ the Lesser Length, or Lesser Transverse Diameter, add 7 times D. and multiply the Sum by d . and unto the Product add the reserved Product.

The Sum divided by the proper Divisor, quotes the first Difference (i.e.) the Tun's Content upon the next Inch from the Lesser Base.

IV. To 3 times the Lesser Length, or Lesser Transverse Diameter, add 12 times D. and multiply the Sum by d . (reserving the Product.)

Then multiply 3 times D. by the Lesser Breadth, or Lesser Conjugate Diameter, and to the Product, add the reserved Product; the Sum divided by the proper Divisor, quotes the second Difference.

V. Six times the Rectangle of D. into d . divided by the proper Divisor, quotes the third Difference,

Difference, which varies not, but is the same throughout the work.

Then with the *third Difference* by a continual Addition, you will have the Table it self.

A General Rule for Inching any Square Tun, consisting of Unequal Bases, and Unequal Sides; or a Tun consisting of Unequal Elliptical Bases, from the Greater Base.

I. Divide the *Difference* of the two Lengths, (if it be a Square) or of the two Transverse Diameters (if it be an Ellipsis) by the Depth, the Quotient is a Number, which call *D*.

Divide also the *Difference* of the two Breadths, or of the two Conjugate Diameters (according to the purport of the Question) by the Depth, the Quotient is a Number, which call *d*.

II. From 3 times the Greater Length, or Greater Transverse Diameter, subtract $1 \frac{1}{2} D$. and multiply the Remainder by the Greater Breadth, or Greater Conjugate Diameter (reserving the Product.)

Then from $1 \frac{1}{2}$ the Greater Length, or Greater Transverse Diameter, subtract the number *D*. and multiply the Remainder by *d*. subtracting the Product from the reserved Product, the Remainder divided by the proper Divisor, quotes the Tuns first Frustum (i.e.) the Content upon the first Inch from the Greater Base.

F

III. From

III. From 3 times the Greater Length, or Greater Transverse Diameter, subtract $4\frac{1}{2}$ times D . and multiply the Remainder by the Greater Breadth, or Greater Conjugate Diameter (reserving the Product.)

Then from $4\frac{1}{2}$ times the Greater Length, or Greater Transverse Diameter, subtract 7 times D . and multiply the Remainder by d . the Product subtract from the reserved Product, and divide the Remainder by the proper Divisor, the Quotient is the first Difference (i.e.) the Tuns Content upon the next Inch from the Greater Base.

IV. From 3 times the Greater Length, or Greater Transverse Diameter, subtract 12 times D . and multiply the Remainder by d . (reserving the Product.)

Then multiply 3 times D . by the Greater Breadth, or Greater Conjugate Diameter, and add the Product to the reserved Product, the Sum divided by the proper Divisor, quotes the second Difference.

V. Six times the Rectangle of D . into d . divided by the proper Divisor, quotes the third Difference, which varies not throughout the work.

Here Note, that the third Difference is continually to be subtracted from the second, and the second from the first, and the first Difference so diminished, to be added to the first Frustum, and so on to every Inch of the Tuns Depth.

The

*The Construction of the first Table for Square
Tuns, &c.*

I. Let a Unit, or 1, with 5 Cyphers annexed, be divided by 282 (*the Cubical Inches in an Ale Gallon*) and the Quotient will be .00355†, the first Number in the Table in the Column for Gallons, and then by a continual addition the Table is made.

II. Let a Unit, or 1, with 7 Cyphers annexed, be divided by 9024 (*the Cubical Inches in an Ale Barrel*) and the Quotient is .0001108—, the first Number in that Column, and the rest are also found by a continual addition.

III. Let a Unit, or 1, with 7 Cyphers annexed, be divided by 10152 (*the Cubical Inches in a Beer Barrel*) the Quotient is .0000985, the first Number for that Column.

Note, That in the use of this Table, after your Multiplication is finished, you must distinguish 5 Figures towards the right hand in the Column for Gallons, and 7 Figures in the other two Columns.

Probl. XV.

In Gauging and Inching Conical Tuns, by the Tables of Area's, it will be necessary to observe these five following NOTES or DIRECTIONS.

Note I.

With a sliding Ruler (made to draw out to 120 Inches, or more) take the Diameters of the Tun at Top and Bottom :

Then take them cross-ways, observing whether the cross Diameters do agree with each other ; For if the cross Diameters both at Top and Bottom differ, then it is Elliptical : But if they differ only in one of them, then it is Elliptical at one end, and Circular at the other.

Note II.

When a Round Tun is exactly Cylindrical (i. e.) when its Diameters are equal, the Tables of Area's of Circles inches the same by inspection : Therefore when a Conical Tun hath small Difference of extreme Diameters, it is Gauged and Inched more facilly, than those that are more remote from a Cylinder.

Note

Note III.

In Gauging and Inching Conical Tuns, that have great Difference of Diameters (*having allowed for the Drip or Fall*) and taken the Diameters in the midst of *each Foot, Half-foot, or Inch of the Depth* (according as you would be more or less exact) insert them gradually in a Paper or Book (*beginning always at the Top.*)

Then (*to prove your work*) find the common *Addend* or *Subducend*, for constituting the Tuns encreasing or decreasing Diameters, after this manner — Divide the *Difference* of the Diameters at Top and Bottom, by the *Altitude* or *Depth* (*as directed in Decimal Arithmetick*) the Quotient sheweth how much any two Diameters encrease or decrease at 1 inch of *Alititude*, either upwards or downwards, which reserve for a common *Addend* or *Subducend*, according to which of the Diameters you begin at; and accordingly note the Diameters at those points you intend your Gradation, either *at the Foot, Half foot or Inch.*

And if the Tuns several Diameters instrumentally taken, do agree with their Arithmetical Calculation, it is a Confirmation the Tun is Conical.

Note IV.

Then if you Gauge to every Inch from the Table of *Area's Inch-deep*, insert against each Diameter, its respective Circles *Area*, in Beer and Ale Barrels, Firkins, Gallons, &c. which reduces the Tun into so many Cylinders, as the Altitude or Depth contains Inches; Which added together, the Sum is the whole Liquid Content of the Tun required.

But if you would gauge the Tun to every 12 or 6 Inches, then from the Table of *Area's* either 12 or 6 Inches (*according to the Tenour of the Question*) insert against each Diameter, its respective Circles *Area* in Beer and Ale Barrels, Firkins, Gallons, &c. And adding them together, the Sum is the whole Liquid Content of the Tun proposed.

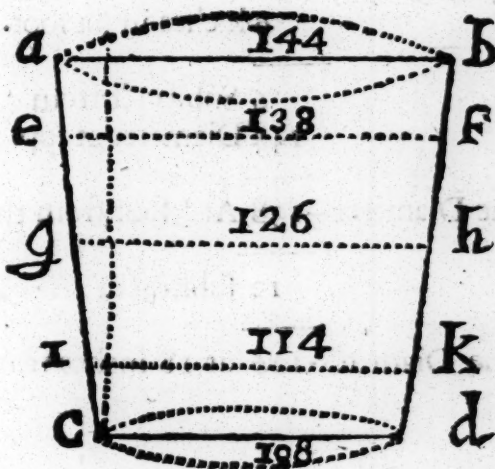
Note V.

For the *Drip* or *Fall* of the Tun, pour Liquor thereinto (*it being empty*) until the uppermost part, or Edge of the Bottom be just covered: Then take that Liquors Depth, in the deepest place in Inches, &c. the one half of which is the *Tuns Fall*; which subtracted from the Depth, leaves the *true Depth* to be made use of in Inching that Tun.

Example.

Example 1.

There is a Conical Tun, far Remote from a Cylinder, viz.



The { Diameter at Top *a.b.* 144 Inches.
Diameter at Bot. *c.d.* 108 Inches.

And Depth ————— 36 Inches.

How to Gauge this Tun by the Tables of
Area's of Circles.

And first upon each Foot.

a.b. Diam. Top. 144 } Inches.
c.d. Diam. Bot. 108 }

Depth 36)36 (1 common *Subducent.*
6 inches in $\frac{1}{2}$ a foot.

6 Subtract from
144 Diameter at top.

Rems the Diameter—138 At $\frac{1}{2}$ foot from the top.

12 subtract.

Rems the Diameter—126 at 18 inches from top.

1 Round

1 Round Depth 36	Tuns Depth every 12 In.	Diam. frō 12 in. to 12 inc.	Circ. Are. from 12 inch. to 12 inch. in Beer. Bar. Fir. Gal.			Circles Area from 12 inch. to 12 inches in Ale. Bar. F. Gal.			Circ. Ar. 1 inc. in Ale Gal. &c.
	36. 6	138	17	.2	.6.48	19	.3	.4.48	49.04
	24. 18	126	14	.2	.8.58	16	.2	.2.58	44.22
	12.30	114	12	.0	.2.34	13	.2	.2.34	36.20
			44	.1	.8.40	50	.0	.1.40	

Which is too little by $1 \frac{1}{4}$ Gallon, a quantity not considerable in Practice. But the best way is to take the Diameters in the Tun at every 6 Inches, or calculate them as directed (Note III.) thus.

Common *Subd.* found 1
Half of 6 Inches is — 3

Product — 3 Subtract.

144 Diameter at top.

141 Dia. 3 inc. from the top.

1 R. 36.	Tuns depths from 6 inches to 6 inches	Tuns Diam. from 6 inches to 6 inches.	Circles <i>Are.</i> 6 inches in Beer.				Circles <i>Ar.</i> 6 inches in Ale.				Circles <i>Area's</i> inch in			
			B.	F.	G.	P.	B.	F.	G.	P.	G.	P.	G.	P.
	36 .3	141	9	.0	.8	.22	10	.1	.4	.22	55	.37		
	30 .9	135	8	.1	.7	.55	9	.2	.0	.55	50	.76		
	24 .15	129	7	.2	.8	.08	8	.2	.6	.08	46	.35		
	18 .21	123	7	.0	.0	.81	7	.3	.4	.81	42	.14		
	12 .27	117	6	.1	.3	.75	7	.0	.4	.75	38	.13		
	6 .33	111	5	.2	.7	.89	6	.1	.5	.89	34	.32		
			44	.2	7	.30	50	.0	.2	.30				

Which is too little only by $\frac{1}{3}$ of a Gallon, a matter inconsiderable in Practice.

He that desireth more exactness, may calculate a Table of the Liquid Content to every Inch, whereby he may by Addition and Substraction, speedily and certainly know the quantity of Beer, or Ale Barrels, Firkins, Gallons, &c. remaining in the Tun at any number of Dry Inches.

Common *Subducend* found-----1

The $\frac{1}{2}$ of an Inch-----.5

Product --- .5 subst. from

The greater Diameter at Top --- 144

Rests Tuns Diameter $\frac{1}{2}$ an Inch } 143.5.
from the Top ----- }

1 Round

	Tuns dep. every inch	Tuns Dia. from inch to inch.	Circles Area's from inch to inch in Beer.			Circles Area's from inch to inch in Ale.			
			B. F. G. &c.			B. F. G. P.			
	36 .5	143 .5	1 .2	3 .35	1 .3	1 .1	35		
	35 .1 .5	142 .5	1 .2	2 .55	1 .3	0 .0	35		
	34 .2 .5	141 .5	1 .2	1 .78	1 .2	7 .78			
	33 .3 .5	140 .5	1 .2	0 .98	1 .2	6 .98			
	32 .4 .5	139 .5	1 .2	0 .20	1 .2	6 .20			
	31 .5 .5	138 .5	1 .1	8 .42	1 .2	5 .42			
	30 .6 .5	137 .5	1 .1	7 .66	1 .2	4 .66			
	29 .7 .5	136 .5	1 .1	6 .89	1 .2	3 .89			
	28 .8 .5	135 .5	1 .1	6 .14	1 .2	3 .14			
	27 .9 .5	134 .5	1 .1	5 .38	1 .2	2 .38			
	26 .10 .5	133 .5	1 .1	4 .64	1 .2	1 .64			
	25 .11 .5	132 .5	1 .1	3 .90	1 .2	0 .90			
	24 .12 .5	131 .5	1 .1	3 .16	1 .2	0 .16			
	23 .13 .5	130 .5	1 .1	2 .43	1 .1	7 .43			
	22 .14 .5	129 .5	1 .1	1 .71	1 .1	6 .71			
	21 .15 .5	128 .5	1 .1	0 .99	1 .1	5 .99			
	20 .16 .5	127 .5	1 .1	0 .28	1 .1	5 .28			
	19 .17 .5	126 .5	1 .0	8 .57	1 .1	4 .57			
	18 .18 .5	125 .5	1 .0	7 .87	1 .1	3 .87			
	17 .19 .5	124 .5	1 .0	7 .17	1 .1	3 .17			
	16 .20 .5	123 .5	1 .0	6 .48	1 .1	2 .48			
	15 .21 .5	122 .5	1 .0	5 .79	1 .1	1 .79			
	14 .22 .5	121 .5	1 .0	5 .11	1 .1	1 .11			
	13 .23 .5	120 .5	1 .0	4 .44	1 .1	0 .44			
	12 .24 .5	119 .5	1 .0	3 .77	1 .0	7 .77			
	11 .25 .5	118 .5	1 .0	3 .11	1 .0	7 .11			
	10 .26 .5	117 .5	1 .0	2 .45	1 .0	6 .45			
	9 .27 .5	116 .5	1 .0	1 .80	1 .0	5 .80			
	8 .28 .5	115 .5	1 .0	1 .15	1 .0	5 .15			
	7 .29 .5	114 .5	1 .0	0 .51	1 .0	4 .51			
	6 .30 .5	113 .5	0 .3	8 .88	1 .0	3 .88			
	5 .31 .5	112 .5	0 .3	8 .25	1 .0	3 .25			
	4 .32 .5	111 .5	0 .3	7 .63	1 .0	2 .63			
	3 .33 .5	110 .5	0 .3	7 .01	1 .0	2 .01			
	2 .34 .5	109 .5	0 .3	6 .40	1 .0	1 .40			
	1 .35 .5	108 .5	0 .3	5 .79	1 .0	0 .79			
			44 .2 .0	62 .50 .0	2 .2 .62				

Now from the preceding Table by Subtraction only, is made the Table following, which shews by Inspection, how many Burels, Firkins, Gallons, &c either of Beer or Ale remain in this Tun, at any Number of Dry Inches given.

1 Round

2 Round Depth 36 Inches.	Dry Inches.	Remaining in the Tun Beer.				Remaining in the Tun Ale.			
		B.	F.	G.	<i>&c.</i>	B.	F.	G.	<i>&c.</i>
	0	44	.2	.0	.62	50	.0	.2	.62
	1	42	.3	.6	.27	48	.1	.1	.27
	2	41	.1	.3	.72	46	.2	.0	.72
	3	39	.3	.1	.96	44	.3	.0	.96
	4	38	.1	.0	.98	43	.0	.1	.98
	5	36	.3	.0	.78	41	.1	.3	.78
	6	35	.1	.1	.36	39	.2	.6	.36
	7	33	.3	.2	.70	38	.0	.1	.70
	8	32	.1	.4	.81	36	.1	.5	.81
	9	30	.3	.7	.67	34	.3	.2	.67
	10	29	.2	.2	.29	33	.1	.6	.29
	11	28	.0	.6	.65	31	.2	.6	.65
	12	26	.3	.2	.75	30	.0	.5	.75
	13	25	.1	.8	.59	28	.2	.5	.59
	14	24	.0	.6	.16	27	.0	.6	.16
	15	22	.3	.4	.45	25	.2	.7	.45
	16	21	.2	.3	.46	24	.1	.1	.46
	17	20	.1	.3	.18	22	.3	.4	.18
	18	19	.0	.3	.61	21	.1	.7	.61
	19	17	.3	.4	.74	20	.0	.3	.74
	20	16	.2	.6	.57	18	.3	.0	.57
	21	15	.2	.0	.09	17	.1	.6	.09
	22	14	.1	.3	.30	16	.0	.4	.30
	23	13	.0	.7	.19	14	.3	.3	.19
	24	12	.0	.2	.79	13	.2	.2	.79
	25	10	.3	.7	.98	12	.1	.2	.98
	26	9	.3	.4	.87	11	.0	.3	.87
	27	8	.3	.2	.42	9	.3	.5	.42
	28	7	.3	.0	.62	8	.2	.7	.62
	29	6	.2	.8	.47	7	.2	.2	.47
	30	5	.2	.7	.96	6	.1	.5	.96
	31	4	.2	.8	.08	5	.1	.2	.08
	32	3	.2	.8	.83	4	.0	.6	.83
	33	2	.3	.1	.20	3	.0	.4	.20
	34	1	.3	.3	.19	2	.0	.2	.19
	35	0	.3	.5	.79	1	.0	.0	.79
	36	0	.0	.0	.00	0	.0	.0	.00

Example.

Example II.

There is a Conical Tun, which is nigher a Cylinder; viz. the Diameter at Top 166 Inches, the Diameter at Bottom 160 Inches, and Depth 12 Inches.

I. For the Whole Content.

The Dia- { Top 166 } Inches.
meter at { Bot. 160 }

Sum 326

Ale G.

$\frac{1}{2}$ is 163 per Table Area's gives 74.00

$\frac{1}{3}$ of the number against 3, { 0.01
the Semi-dif. of Diam. }

The Sum is the Area of a Mean Circle—74.01
Altitude or Depth, Inches 12

Respons. The Content in Ale Gallons 888.12

i.e. 24 Beer Barrels, 2 Firk. 6 Gal. $\frac{1}{2}$ propè.

II. To

II. To Inch it.

The Diamater at $\left\{ \begin{array}{l} \text{Top } 166 \\ \text{Bot. } 160 \end{array} \right\}$ Inches.

The half of an Inch is $\overset{12)6.0(.5 \text{ common } Subd.}{\text{---}.5}$

Product $\text{---} \text{---} .25$ subtract.

From the greater Diam- }
eter at Top $\text{---} \text{---} \text{---}$ } 166.
Rests the Diameter $\text{---} \text{---} 165.75$.
 $\frac{1}{2}$ an Inch from the Top.

2 Round

2 Round Depth 12.	Tuns depth every Inch.		Tuns Dia- meter from inch to inc.	Circles <i>area's</i> from inch to inch in Beer.				Circles <i>Area's</i> from inch to inch in Ale.			
				B. F. G. &c.				B. F. G. &c.			
12	.5	165 .75	2	0	4	.52	2	1	4	.52	
11	.1.5	165 .25	2	0	4	.05	2	1	4	.05	
10	.2.5	164 .75	2	0	3	.59	2	1	3	.59	
9	.3.5	164 .25	2	0	3	.14	2	1	3	.14	
8	.4.5	163 .75	2	0	2	.68	2	1	2	.68	
7	.5.5	163 .25	2	0	2	.22	2	1	2	.22	
6	.6.5	162 .75	2	0	1	.77	2	1	1	.77	
5	.7.5	162 .25	2	0	1	.32	2	1	1	.32	
4	.8.5	161 .75	2	0	0	.87	2	1	0	.87	
3	.9.5	161 .25	2	0	0	.42	2	1	0	.42	
2	.10.5	160 .75	1	3	8	.97	2	0	7	.97	
21	.11.5	160 .25	1	3	8	.52	2	0	7	.52	
			24 .2 6 .07				27 .3 .0 .07				

Now from hence is made the following Table by Substraction only, which readily shews how many Barrels, Firkins, Gallons, &c. remain in the Tun at any Number of *Dry Inches* inquired of.

2 Round

	Dry Inches.	Remaining in the Tun	Remaining in the Tun
		Beer.	Ale.
2 Round depth 12	0	24.2 .6 .07	27 .3 .0 .07
	1	22.2 .1 .55	25 .1 .3 .55
	2	20.1 .6 .50	22 .3 .7 .50
	3	18.1 .2 .91	20 .2 .3 .91
	4	16.0 .8 .77	18 .0 .7 .77
	5	14.0 .6 .09	15 .3 .4 .09
	6	12.0 .4 .87	13 .2 .1 .87
	7	10.0 .3 .10	11 .1 .0 .10
	8	8.0 .1 .78	8 .3 .7 .78
	9	6.0 .0 .91	6 .3 .0 .91
	10	3.3 .8 .49	4 .1 .7 .49
	11	1.3 .8 .52	2 .0 .7 .52
	12	0.0 .0 .00	0 .0 .0 .00

Example:

Example. III.

Shall be of a Pyramidal Square Ten, consisting of two Unequal Quadrangular Bases, but Equal Sides at each Base.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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3 Square 22	Tuns Depth every Inch.	Tuns Sides from inch to inch.	Circles Area's from inch to inch. In Bear.	Circles Area's from inch to inch. in Ale.
			B. F. G. &c.	B. F. G. &c.
	22 .0.5	99 . 5	0 . 3 . 8 . 11	1 . 0 . 3 . 11
	21 .1.5	98 . 5	0 . 3 . 7 . 41	1 . 0 . 2 . 41
	20 .2.5	97 . 5	0 . 3 . 6 . 71	1 . 0 . 1 . 71
	19 .3.5	96 . 5	0 . 3 . 6 . 02	1 . 0 . 1 . 02
	18 .4.5	95 . 5	0 . 3 . 5 . 34	1 . 0 . 0 . 34
	17 .5.5	94 . 5	0 . 3 . 4 . 67	0 . 3 . 7 . 67
	16 .6.5	93 . 5	0 . 3 . 4 . 00	0 . 3 . 7 . 00
	15 .7.5	92 . 5	0 . 3 . 3 . 34	0 . 3 . 6 . 34
	14 .8.5	91 . 5	0 . 3 . 2 . 69	0 . 3 . 5 . 69
	13 .9.5	90 . 5	0 . 3 . 2 . 04	0 . 3 . 5 . 04
	12 .10.5	89 . 5	0 . 3 . 1 . 41	0 . 3 . 4 . 41
	11 .11.5	88 . 5	0 . 3 . 0 . 77	0 . 3 . 3 . 77
	10 .12.5	87 . 5	0 . 3 . 0 . 15	0 . 3 . 3 . 15
	9 .13.5	86 . 5	0 . 2 . 8 . 53	0 . 3 . 2 . 53
	8 .14.5	85 . 5	0 . 2 . 7 . 92	0 . 3 . 1 . 92
	7 .15.5	84 . 5	0 . 2 . 7 . 32	0 . 3 . 1 . 32
	6 .16.5	83 . 5	0 . 2 . 6 . 72	0 . 3 . 0 . 72
	5 .17.5	82 . 5	0 . 2 . 6 . 14	0 . 3 . 0 . 14
	4 .18.5	81 . 5	0 . 2 . 5 . 55	0 . 2 . 7 . 55
	3 .19.5	80 . 5	0 . 2 . 4 . 98	0 . 2 . 6 . 98
	2 .20.5	79 . 5	0 . 2 . 4 . 41	0 . 2 . 6 . 41
	1 .21.5	78 . 5	0 . 2 . 3 . 85	0 . 2 . 5 . 85
			17 . 1 . 0 . 8	19 . 1 . 5 . 08

A Practical Table of the preceding Tun, shewing by Inspection, how many Bar. Fir. Gal. remain therein at any Number of Dry Inches.

	Dry Inches.	Refts in the Tun Beer.				Refts in the Tun Ale.			
		B.	F.	G.	℥c.	B.	F.	G.	℥c.
	0	17	1	0	08	19	1	5	08
	1	16	1	0	97	18	1	1	97
	2	15	1	2	56	17	0	7	56
	3	14	1	4	85	16	0	5	85
	4	13	1	7	83	15	0	4	83
	5	12	2	2	49	14	0	4	49
	6	11	2	6	82	13	0	4	82
	7	10	3	2	82	12	0	5	82
	8	9	3	8	48	11	0	7	48
	9	9	0	5	79	10	1	1	79
	10	8	1	3	75	9	1	4	75
	11	7	2	2	34	8	2	0	34
	12	6	3	1	57	7	2	4	57
	13	6	0	1	42	6	3	1	42
	14	5	1	1	89	5	3	6	89
	15	4	2	2	97	5	0	4	97
	16	3	3	4	65	4	1	3	65
	17	3	0	6	93	3	2	2	93
	18	2	2	0	79	2	3	2	79
	19	1	3	4	24	2	0	3	24
	20	1	0	8	26	1	1	4	26
	21	0	2	3	85	0	2	5	85
	22	0	0	0	00	0	0	0	00

3 Square
22

G 2

Example

Example IV.

Shall be of a Tun consisting of unequal Elliptical Bases.

The Transverse Diameter above 190 Inches,
the Conjugate Diameter above 144 Inches; the
Transverse Diameter below 154 Inches, and the
Conjugate Diameter below 120 Inches; and the
Altitude or Depth 24 Inches.

I. For the whole Content.

	Inch.		Inch.
The {	Transv. Dia. above 190	Inch {	Transv. Dia. below 154
	Conju. Dia. above 144		Conju. Dia. below 120

A mean Propor. is 165.4 A mean Propor. 135.9.
Add — 135.9.

Sum — 301.3

The $\frac{1}{2}$ is ——— 150.6 Ale Gal.
150.6 Per Table of Area's gives ——— 63.16
Semi-difference of Diam. 14.7 = 0.60. } 0.20
whose $\frac{1}{2}$ is ——— }
Sum is the Area of a mean Circle — 63.36
Altitude or Depth Inches — 24

Respons. The Content in Ale Gallons 1520.64
(i.e.) 42 Bar. 0 Firks 8 $\frac{1}{2}$ + of Beer.

II. To

II. To find the Content upon each Foot.

Transv. { Above 190 } Inch. Altitude 24 Inch.
Diamet. { Below 154 }

24)36.0 (1.5 Subducend.
Inches in $\frac{1}{2}$ a foot—6

Product — 9.0 Subtracted from.
The Transverse }
Diameter above— } 190

Rems the Trans- }
verse Diameter— } 181 $\frac{1}{2}$ a foot from the Top.

Conjugate { Above 144 }
Diameter { Below 120 } Inches.

24)24.0 (1.0 Subducend.
Inches in $\frac{1}{2}$ a foot—6

Product — 6.0 Subtracted from
The Conjug. Dia. above 144

Rems Conj. Diam. 138 $\frac{1}{2}$ a foot from Top.

4 Ellip. 24	1 un's depth ev cry 12 inches.	Transv. Dia. from 12 inc. to 12 inch	Conju. Dia. from 12 inc. to 12 inch.	Mean Diameter.	Circle's Area's 12 Inches in Beer.	Circle's Area's 12 Inches in Ale.	Circles Area's 1 Inch in
					B.F.G. &c.	B.F.G. &c.	G. &c.
	24 6	181	138	158	23 0 6 32	26 0 2 32	69 53
	12 18	163	126	143.25	19 0 1 82	25 1 5 82	57 15
					42 0 8 14	47 2 0 14	

III. To find the Content upon every 6 Inches.

Suducend for the Transv. Dia. 1.5 }
Half of 6 Inches is ———— 3 } Inches.

Product 4.5 Subtract.
From the Transv. Dia. above 190

Rests Transverse Diameter 185.5. 3 inc. from top

Subducend for the Conjugate Dia. 1.7 }
Half of 6 Inches is ———— 3.5 } Inches.

Product ———— 3 Subtract.
From the Conjugate Dia. above 144

Rests Conjugate Diameter ———— 141.3 inc. frō top

4 Ellip. 24.	Tun's depth every 6 Inches.	Transv. Dia. from 6 inch. to 6 inch.	Conju. Dia. from 6 inch. to 6 inch.	Mean Diameter.	Circle's Area's 6 Inches. in Beer.	Circle's Area's 6 Inches in Ale.	Circle's Area's 1 Inch in	
					B.F.G.&c	B.F.G.&c	G.&c	
24	3	185	5	141	161 75	12 0 5 20	13 2 5 20	72 87
18	9	176	5	135	154 5	11 0 2 89	12 1 6 89	66 48
12	15	167	5	129	146 5	9 3 8 87	11 0 7 87	59 57
6	21	158	5	123	139 75	9 0 2 36	10 0 6 36	54 39
					42 1 1 32	47 2 2 32		

IV. To find the Content upon every Inch.

Subducend for the Transverse Diam.—————1.5

The $\frac{1}{2}$ of an Inch—————0.5

Product—————0.75

Substr. from the Tranverse Diam. above—190

Transver. Diam. $\frac{1}{2}$ an Inch from the top 189.25

Subducend for the Conjugate Diameter————1

The $\frac{1}{2}$ of an Inch—————0.5

Product—————0.5

Substr. from the Conjugate Diam. above 144

Conjugal Diam. $\frac{1}{2}$ an Inch from the top 143.5

4 Ellip. 24.	Tun's Depth every Inch.		Trans. Diam. from Inch to Inch.		Conju. Diam. from Inch to Inch.		Mean Diameter.		Circle's Area's in Beer.		Circle's Area's in Ale.			
									B.F.G.C.		B.F.G.C.			
24	0.5	189.25	143.5	165.00	2	03	82	2	13	82				
23	1.5	187.75	142.5	163.75	2	02	68	2	12	68				
22	2.5	186.25	141.5	162.50	2	01	54	2	11	54				
21	3.5	184.75	140.5	161.25	2	00	42	2	10	42				
20	4.5	183.25	139.5	160.00	1	38	30	2	07	30				
19	5.5	181.75	138.5	158.75	1	37	18	2	06	18				
18	6.5	180.25	137.5	157.50	1	36	9	2	05	9				
17	7.5	178.75	136.5	156.25	1	35	00	2	04	00				
16	8.5	177.25	135.5	155.00	1	33	91	2	02	91				
15	9.5	175.75	134.5	153.75	1	32	84	2	01	84				
14	10.5	174.25	133.5	152.50	1	31	77	2	00	77				
13	11.5	172.75	132.5	151.25	1	30	71	1	37	71				
12	12.5	171.25	131.5	150.00	1	28	66	1	36	66				
11	13.5	169.75	130.5	148.75	1	27	62	1	35	62				
10	14.5	168.25	129.5	147.50	1	26	59	1	34	59				
9	15.5	166.75	128.5	146.25	1	25	57	1	33	57				
8	16.5	165.25	127.5	145.00	1	24	56	1	32	56				
7	17.5	163.75	126.5	143.75	1	23	55	1	31	55				
6	18.5	162.25	125.5	142.50	1	22	55	1	30	55				
5	19.5	160.75	124.5	141.25	1	21	57	1	27	57				
4	20.5	159.25	123.5	140.00	1	20	59	1	26	59				
3	21.5	157.75	122.5	138.75	1	18	62	1	25	62				
2	22.5	156.25	121.5	137.50	1	17	66	1	24	66				
1	23.5	154.75	120.5	136.25	1	16	74	1	23	74				
									42	10	54	47	21	54

A Practical Table of the preceding Tun, which shews by Inspection, how many Barrels, Firkins, Gallons, &c. remain therein, at any Number of Dry Inches.

Dry inch.	Refts in the Tun Beer.				Refts in the Tun Ale.			
	B.	F.	G.	&c.	B.	F.	G.	&c.
1	40	0	5	72	45	0	5	72
2	38	0	3	04	42	3	3	04
3	36	0	1	50	40	2	1	50
4	34	0	1	8	38	1	1	08
5	32	0	1	78	36	0	1	78
6	30	0	3	60	33	3	3	60
7	28	0	6	51	31	2	6	51
8	26	1	1	51	29	2	2	51
9	24	1	6	60	27	1	7	60
10	22	2	3	76	25	1	5	76
11	20	3	1	99	23	0	5	99
12	19	0	1	28	21	1	5	28
13	17	1	1	62	19	1	5	62
14	15	2	3	00	17	2	0	00
15	13	3	5	41	15	2	4	41
16	12	0	8	84	13	3	0	84
17	10	2	4	28	11	3	6	28
18	9	0	0	73	10	0	4	73
19	7	1	7	18	8	1	4	18
20	5	3	5	61	6	2	4	61
21	4	1	5	02	4	3	6	02
22	2	3	5	40	3	1	0	40
23	1	1	6	74	1	2	3	74
24	0	0	0	00	0	0	0	00

4 Ellip.
24.

Example

Example V.

Shall be of a Square Tun, consisting of Unequal Bases, and Unequal Sides.

The Length { Above 200 } Inches.
 { Below 170 }

Altitude 20) 30 (1.5 Subduc.
The $\frac{1}{2}$ of an Inch ————.5

Product ————.75
Substr. from the Length above 200.

Rests the Length $\frac{1}{2}$ an Inch } 199.25
from the top ————— }

The Breadth { Above 160 } Inches.
 { Below 130 }

Altitude 20) 30.0 (1.5 Subduc.
The $\frac{1}{2}$ of an Inch ————.5

Product ————.75
Substr. from the Breadth above 160.

Rests the Breadth $\frac{1}{2}$ an Inch } 159.25
from the top ————— }

5 Square

5 Square 20

Tuns depth every Inch.	Length from inch to inch.	Breadth from inch to inch.	Mean.	Area's in Beer.	Area's in Ale.
				B.F.G.&c.	B.F.G.&c.
16 0.5	199 25	159 25	178 50	3 0 4 99	3 2 0 99
15 1.5	197 75	157 75	176 75	3 0 2 78	3 1 6 78
14 2.5	196 25	156 25	175 00	3 0 0 60	3 1 4 66
13 3.5	194 75	154 75	173 50	2 3 7 75	3 1 2 75
12 4.5	193 25	153 25	172 00	2 3 5 91	3 1 0 91
11 5.5	191 75	151 75	170 50	2 3 4 09	3 0 7 09
10 6.5	190 25	150 25	169 00	2 3 2 28	3 0 5 28
9 7.5	188 75	148 75	167 50	2 3 0 49	3 0 3 49
8 8.5	187 25	147 25	166 00	2 2 7 72	3 0 1 72
7 9.5	185 75	145 75	164 50	2 2 5 96	2 3 7 96
6 10.5	184 25	144 25	163 00	2 2 4 22	2 3 6 22
5 11.5	182 75	142 75	161 50	2 2 2 49	2 3 4 49
4 12.5	181 25	141 25	160 00	2 2 0 78	2 3 2 78
3 13.5	179 75	139 75	158 50	2 1 8 09	2 3 1 09
2 14.5	178 25	138 25	157 00	2 1 6 41	2 2 7 41
1 15.5	176 75	136 75	155 50	2 1 4 75	2 2 5 75
0 16.5	175 25	135 25	154 00	2 1 3 10	2 2 4 10
4 17.5	173 75	133 75	152 50	2 1 1 47	2 2 2 47
3 18.5	172 25	132 25	151 00	2 0 8 86	2 2 0 86
2 19.5	170 75	130 75	149 50	2 0 7 26	2 1 7 26
				53 0 0 00	59 2 4 00

A Pract.

A Practical Table of the preceding Tun, which shews by Inspection how many Bar. Firk. Gal. &c. remain in the Tun, at any Number of Dry Inches.

Dry Inches	Refts in the Tun				Refts in the Tun			
	Beer.				Ale.			
	B.	F.	G.	&c.	B.	F.	G.	&c.
0	53	0	0	00	59	2	4	00
1	49	3	4	01	56	0	3	01
2	46	3	1	23	52	2	4	23
3	43	3	0	63	49	0	7	63
4	40	3	1	88	45	3	4	88
5	37	3	4	97	42	2	3	97
6	35	0	0	88	39	1	4	88
7	32	0	7	60	36	0	7	60
8	29	1	7	11	33	0	4	11
9	26	2	8	39	30	0	2	39
10	24	0	2	43	27	0	2	43
11	21	1	7	21	24	0	4	21
12	18	3	4	72	21	0	7	72
13	16	1	3	94	18	1	4	94
14	13	3	4	85	15	2	3	85
15	11	1	7	44	12	3	4	44
16	9	0	2	69	10	0	6	69
17	6	2	8	59	7	2	2	59
18	4	1	7	12	5	0	0	12
19	2	0	7	26	2	1	7	26
20	0	0	0	00	0	0	0	00

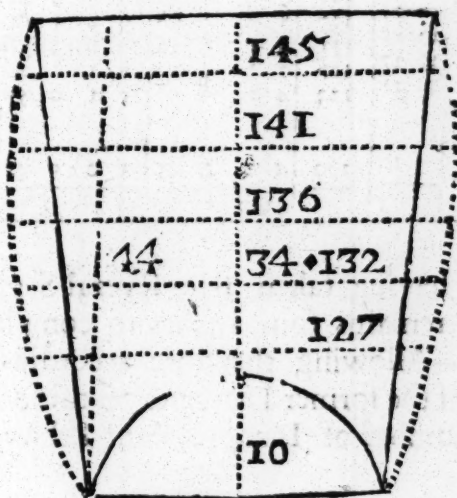
5 Square 20

Example.

Example VI.

Shall be of a Copper.

FIGURE X.



Rule.

With the several Diameters taken in the Copper (by aid of a sliding Rule) enter the proper Table of *Area's* of Circles, and take out the *Area's* correspondent to the several Diameters, as you did in a Conical Tun.

Copper

Cop.	Coppers depth every 6 Inches.	Diameter 6 inc. to 6 inches.	Circles <i>Ar.</i> from 6 inc. to 6 inches in Beer.				Circles <i>Ar.</i> from 6 inc. to 6 inches in Ale.				Circles <i>Ar.</i> 1 inch-deep in		
			B. F. G. & c.				B. F. G. & c.						
{	44	3	145	9	3	0	34	10	3	7	34	58	56
	38	9	141	9	0	8	22	10	1	4	22	55	37
	32	15	136	8	2	3	08	9	2	5	08	47	51
	26	21	131	8	0	3	16	9	0	3	16	45	80
	20	27	126	7	1	4	29	8	1	1	29	44	92
	14	31	123	4	2	0	56	5	1	0	56	42	14
{ Rising Crown	10	109	4	2	3	45	5	0	5	45			
			52	0	5	10	58	3	3	10			

Now having taken five several Segments, there still remains four Inches to compleat the Depth—Allowing therefore according to the decrease of the former Diameter on this 6 Inches, and the number of Inches I want I thus work :

B. F. G. & c.

123 Inches Diameter gives on an }
 Inch per Table ————— } 1 . 0 . 6 . 14 .
 Multiplied by the number of {
 Inches wanting ; viz. ————— } ————— 4
 —————

The Product is the Content of the }
 4 Inches ————— } 4 . 2 . 6 . 56 .

Which

Which insert under the former. Then for the Content of the Crown enter the Table (entituled, *A Table for finding the Content of the Crown of a Copper*) with half the Altitude at top, and the Diameter in the side Column, and in the common Angle you have the Content in Beer and Ale Barrels, Firkins, Gallons, &c. which insert also under the other. Then add them all together, and the sum is the whole Content of the Copper; *as by the example may appear.*

Note, That this Table supposes the Crown of the Copper to be the Segment of a *Sphere*, which Method I presume most practical Gaugers follow.

Then for the Mash Tun.

Enter the Table with the Mean Diameter of the Goods usually Wet, and against it you have the Content in Bushels, Gallons, &c.

Example.

	B. G. P.
Mash-Tun Round, Mean Diameter	}
101 Inches per Table gives	} 4 . 3 . 5 1

This Table was calculated, according to the following Proportion.

As 4 to 5 (or as 8 to 10) so is the Liquid Gallons correspondent to the Mean Diameter, to the respective numbers in the Table.

But

But some say, this Proportion is too little, it being rather as 4 to 6, which I leave to the discretion of the Practical Gauger, to be regulated according to the Country Malt made use of.

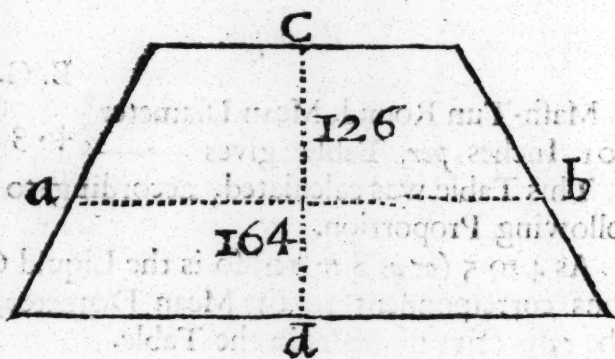
And note that,

2 Pints	} make a	Quart.
4 Quarts		Gallon.
2 Gallons		Peck.
4 Pecks		Bushel.
8 Bushels		Quarter.

Probl. XVI.

How to Gauge a Back, or Cooler, by the first Table for Square Tuns, Backs, &c.

FIGURE XI.



I. Back

I. *Back next the M. T.*

Inch.	Gal.		Beer Bar.
Length—164=	58154	or thus	164=.0161544
Breadth=	126		126
<hr/>			<hr/>
348924			969264
116308			323088
58154			161544
<hr/>			<hr/>

Respons. the
Content in }
Ale Gallons }

73.27404

2.0354544

i. e. 2 Bar. o. Firk. 1 $\frac{1}{4}$ Gal. of Beer.

Thus you have the Content of any Back at a Multiplication, either in Gallons, or in Beer, or Ale Barrels.

Now it will be necessary to have four Tables ; The *First*, to convert Gallons into Beer or Ale Barrels ; The *Second* to convert Decimal parts of a Barrel of Beer into Gallons ; The *Third*, to convert Decimal parts of a Barrel of Ale into Gallons ; and the *Fourth*, to convert Barrels of Beer into Barrels, &c. of Ale, & *à contrà* : And thus the Practical Gauger is compleatly fitted.

H

II. *Back*

II. *Back over the Guile Tun.*

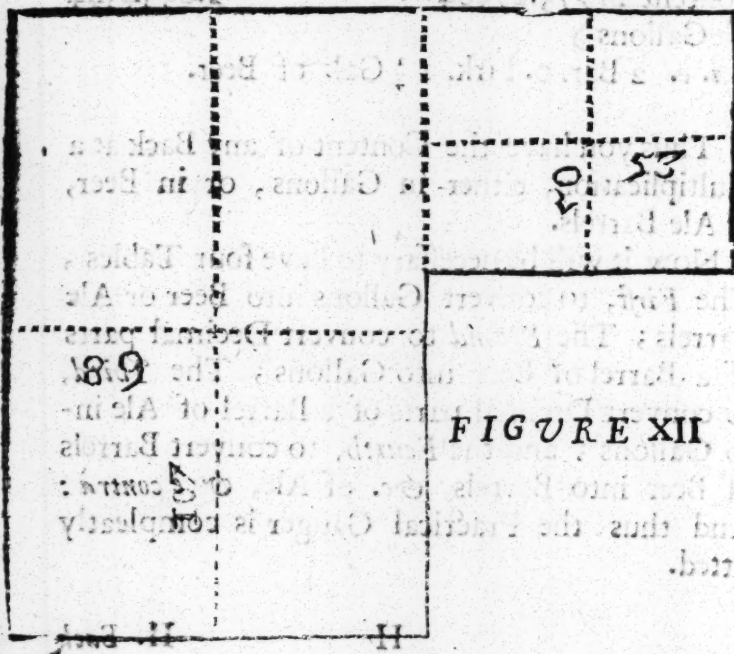
Inches of { Length 144 per Table p. = .49999
 Breadth ———— 132

Respons. Ale Gallons 65.99868
(i.e. 1 Bar. 3 Firk. 3 Gal. of Beer fir.)

III. *Back next the 2d.*

Inches of { Breadth 115 per Table p. = .40779
 Length ———— 366

Respons. Ale Gallons 149.251¹⁴
(i.e. 4 Bar. 0 Firk. 5 $\frac{1}{2}$ Gallons of Beer +)

IV. *Back*

IV. Back under the 2d.

Inch. of Length. 107 = 37492 Leng. 53 = 18789
 Breadth ———— 89 Breadth ———— 50

Ale Gallons } 33.76838 Ale G. 9.39450
 } 9.39450.

Res. Content 43.16288.

(i.e. 1 Bar. 0 Firk 7 $\frac{1}{8}$ Gallons propè.)

Probl. XVII.

How to Gauge the Liquor or Wort, in any Back or Cooler.

Rule.

Divide the Sum of the Wet Inches taken in all the places (which ought to be in large Backs, every 5 or 6 Foot square every way) by the number of places they were taken at, the Quotient is the Depth to be made use of, as by the Example underneath may appear.

A Gauger finds in	5	4
several places the	5	4
Wet Inches	4	4
	4	4
	3	4
	3	0

Number of places 6) 26 (4 $\frac{1}{2}$ true dep.

Note, That the Tables of Allowances are not exactly calculated : but being those generally agreed on and used in the *Excise Office*, I was willing to insert them ; however, he that will may find the *Neat Money* at a single Multiplication, using these Multipliers :

$$\text{Viz. } \left. \begin{array}{l} .032609 + \\ .141304 - \\ .147727 - \end{array} \right\} \text{ for } \left\{ \begin{array}{l} \text{Small Beer.} \\ \text{Strong Beer.} \\ \text{Strong Ale.} \end{array} \right.$$

And these Multipliers are found, by dividing .75 the Decimal of 15 shillings by 23 for *Small Beer* : And dividing 3.25 the Decimal of 3 *l. 5. sh.* for *Strong Beer* by 23 : And by dividing 3.25 for *Strong Ale* by 22.

Remembring to distinguish 6 figures towards the right hand, according as you were directed in Decimal Arithmetick : Now the figures towards the left hand are pounds, and the 6 figures cut off, or distinguished, the Decimal fractions of a pound : And to find the value thereof, observe this General Rule, *viz.*

The First Figure of the Decimal Fraction represents Twice as many Shillings, as the Figure it self is in value ; and the Two next Figures are so many Farthings (wanting one) as the Figures themselves are in value : Only note, that if the Second Figure of the Fraction be 5, or above 5, then you must add 1 Shilling more to the Shillings before

Before found: Now the other Figures after the 3 foremost, being only the Fraction of a Farthing, are inconsiderable in Practice.

Example.

I desire to know how much the Duty of 200 Barrels of Small Beer will amount unto, the Allowance deducted.

The Multiplier for Small Beer is .032609 +
The number of Barrels given ———— 200

Resd. 6 l. 10 sh. 5 d. $\frac{1}{2}$ ———— 6.521800

Now to Reduce all to Practice.

Suppose a Brewer hath Cleansed in a Week three Guiles of Beer and Ale from the former Vessels, and the Dimensions taken by the Gaugers are as followeth; how much ought to be returned into the Office of Excise? and what doth the Duty thereof amount unto?

August the 3d. 1673. 7 morning.

B. F. G.

1 R. 3 Inches Dry x. (or Strong Beer) 39.3.2
 2 R. 5 x. ————— 14.0.6
 4 Ellip. 13 x. ————— 17.1.2

Sum ————— 71.1.8

August 5th. 1673. 8 morning.

1 R. 5 A. (or Ale) ————— 41.1.4
 2 R. 7 A. ————— 11.1.0
 4 Ellip. 13 A. ————— 12.1.6

Sum ————— 72.0.2

August 7th. 1673. 3 morning.

1 R. 11 x. ————— 28.0.7
 4 Ellip. 10 x. ————— 3.3.8
 3 S. 5 x. ————— 12.2.2

Sum ————— 44.2.8

So the whole is 116 Barrels of Strong Beer,
 and 72 Barrels of Ale, which the Gauger may
 safely return.

Multiplicator

[103]

Multiplicator proper for Strong Beer is .141304.
 Number of Barrels ————— 116.

Respons. 16 l. 7 sh. 10 d. ————— 16.391264

By the Table 100 Barrels is 14.12.9
 16 2.5.6

Sum ————— 16.8.3

Multiplicator for Ale ————— .147727
 Number of Barrels ————— 72

Respons. 10 l. 12 sh. 8 d. $\frac{3}{4}$ ————— 10.636344

By the Table 10 l. 12 sh. 10 d. $\frac{1}{2}$

I shall not trouble my self nor Reader with any more examples to illustrate the Tables, judging that person that doth not now understand them, unfit to meddle with things of this nature: But shall proceed to CASK GAUGING.

CHAP.

Having a Cask's Diameters and Length: To find the Diagonal.

To the Square of the Semi-sum of the Diameters, add the Square of the Semi-length, the Square Root of the Sum is the *Diagonal*.

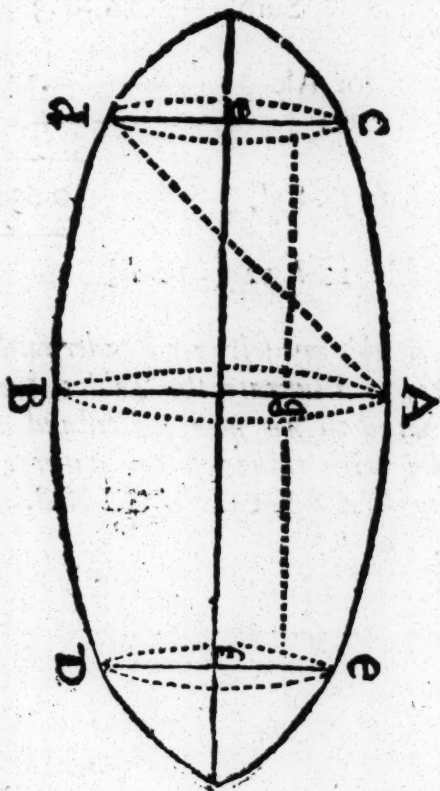


FIGURE XIII.

Example.

A.B. Boun^g Diam. 29 } *Inch.* Length 48 *Inch.*
c.d. Head Diameter 23 }

Sum ——— 52

$\frac{1}{2}$ Sum ——— 26 squared is ——— 676.
 Semi-length 24 squared is ——— 576.

Whose Squ. Root 35.3835 }
 is the *Diagonal A. d.* ——— 1252

Probl. II.

Having a Cask's Diameters and Diagonal: To find the Length?

Rule.

From the Square of the Diagonal, substract the Square of the Semi-sum of Diameters, the Square Root of the Remainder is the *Semi-length*.

Figure 13.

Example.

Diagonal A. d. 35.3835 square is ——— 1252.
 Semi-sum of Diameters 26 squared is ——— 676.

Whose Square Root 24 is the *Semi-length* 576.

2

48 the whole Length.

Probl.

Probl. III.

Having a Cask's Length and Diameters: To find the Slant-Hight?

Rule.

To the Square of the Semi-length, add the Square of the Semi-difference of Diameters, the Square Root of the Sum is the Slant-Hight required.

Figure 13.

Example.

Square of 24, the Semi-length is 576.
 Square of 3, the Semi-differ. of Diameter 9.
 Whole Squ. Root 24.19. is A.C. the Slant-Height 58.52

Probl. IV.

Having the Diagonal, Length and Slant-Hight of a Cask: To find the Diameters.

Rule.

I. From the Square of the Diagonal, Subtract the Square of the Semi-length, the Square Root

Root of the Remainder is the *Semi-sum of Diameters*.

II. From the Square of the Slant-Height, Subtract the Square of the Semi-length, the Square Root of the Remainder is the *Semi-difference of Diameters*.

III. The Semi-sum of the Diameters }
more, the Semi-difference is the *Greater* } *Diam.*

The Semi-sum less, the Semi-difference is the *Lesser* } *Diam.*

Figure 13. Example.

A. d. the Diagonal 35.3835 squared is = 1252.

The Semi-length 24 squared is = 576

Whose Squ. Root 26 is the *Semi-sum of Diam.*

A.C. the Slant-Height 24.19 squared is = 585.

Semi-length 24 squared is = 576.

Whose Square Root 3 is the *Semi-difference of Diameters*.

The Semi-sum of the Diam. 26. add and subtr.

So the *Diameters* are } 29 *Base*.
 } 23 *Head*.

He that knows how to vary the Sides of a Rectangled plain Triangle, must needs understand

stand how to find the Length, Diagonal and Diameter of a Cylindrical Cask.

Probl. V.

Having a Cask's Dimensions : To find the Liquid Content in Wine or Ale Gallons, by the Table of Area's of Circles, under these four Notions; viz. CYLINDRICAL, SPHÆROIDAL, PARABOLICAL or CONICAL.

I. If a Cask be Cylindrical.

Enter the Table with the Diameter, and against it you have the *Area* correspondent thereto, which multiplied by the Length, the Product is the Liquid Content.

Figure 13.

Example.

		Ale G.
A.B. Diameter at the Base 23 Inches	}	
per Table	1.4733	
Cask's Length	27.4	
Respons. Cask's Content as Cylindrical	40.36842	

II. If

II. If a Cask be taken as the Middle Frustum of a Spheroid, intercepted between two parallel Planes, cutting the Axe at Right Angles.

Rule.

Take out the Numbers in the Table, agreeing to the Diameters; viz. Twice for the Diameter at the Bounding, and once for the Diameter at the Head. Add them together, and you have the Tripled Area of a Mean Circle; which multiplied by $\frac{1}{3}$ of the Cask's Length, produces the Liquid Content.

Figure 13.

Example.

A London Beer Barrel's Bounding Diameter A.B. is 23 Inches c. d. or c. D. each Head Diameter 19.9 Inches, and Length 27.4 Inches.

Ale Gal.

Area of the Bounding Circle 23 doubled is = 2.9466

Area of the Head Circle 19.9 = = = 1.1029.

Tripled Area of a Mean Circle ——— 4.0495.

Length 27.4, the $\frac{1}{3}$ thereof is ——— 9.1333.

Ref. Content as Sphaeroidal Ale G. 36.98529835

III . If

MR. If a Cask be taken as the Middle Frustum of a Parabolical Spindle, intercepted between two parallel Planes, and cutting the Axe at Right Angles.

Rule.

To the Doubled Area of the Bounding Circle, add the Area of the Head Circle, and from the Sum subtract four times the Area against the Difference of Diameters, the Remainder is the Tripled Area of a Mean Circle; which multiplied by $\frac{1}{3}$ of the Length, the Product is the Liquid Content.

Figure 13.

Example.

Ale G.
 Area of the Bounding Circle 23 doubled }
 per Table ————— } 2.9466
 Area of the Head Circle 19. 9 ——— 1.1029
 Sum ————— 4.0495
 3.1 Inches of Dia. 0.268 multip. by 4. = 0.1072
 Subtr. Rests the Trip. Area of a M: Circle 3.9423
 Length 27.4 Inches the $\frac{1}{3}$ thereof is — 9.1333
 Resp. Content as Parabolical Ale G. 36.00620859
 IV. If

IV. If a Cask be taken as the Middle Frustum of two Cones, abutting upon one Common Base, intercepted between the two parallel Planes, and cutting the Axe at the Right Angles.

Rule.

To the Area of the Bounding Circle, add the Area of the Head Circle, and from the Sum subtract $\frac{1}{4}$ of the Area against the Difference of Diameters, the Remainder multiplied by the Semi-length, produces the whole Content.

Figure 13.

Example.

Ale Gal.

Area of the Bounding Circle 23 Inches² per Table is ————— } 1.4733.

Area of the Head Circle 19.9. gives — 1.1926

Sum — 2.5762

Diff. of Dia. 3.1 inch. 0.268 whose $\frac{1}{4}$ is 0.0689.

Refts 2.5973.

Length 27.4 Inches, the $\frac{1}{2}$ thereof is — 13.7.

Respon. Casks Content as Conical } 35.17201.

Ale Gallons.

The

The Construction of the Table's of Area's of Circles.

I. Divide a Unit or 1 with Cyphers, by 282 (*the Cubical Inches in an Ale Gallon*) and multiply the Quotient by .78539 (*the Area of a Circle whose Diameter is Unity*) the Product is .0027851† a constant Multiplier; by which if you multiply the Square of any Diameter, the Product is the Circles Area correspondent in Ale Gallons.

II. Divide a Unit or 1 with Cyphers by 231 (*the Cubical Inches in a Wine Gallon*) and multiply the Quot. by .78539 the Product .0034† is a constant Multiplier; by which if you multiply the Square of any Diameter, the Product is the Circles Area correspondent in Wine Gallons.

Or those that are ready in *Division of Decimals*, may divide the Square of the Diameters by 359.0536 for Ale Gallons, or by 294.1184 for Wine Gallons, the Quotient is the Circles Area (*according to the Divisor made use of*) and these Divisors are found by multiplying 282 and 231 severally, by 1.27324† *the Square of the Diameter of a Circle, whose Area is Unity.*

Note. That the second Table for Square Tuns was made, by multiplying the Square of the several Diameters by 0035461.

Example.

[113]

Example.

$$\begin{array}{r} 282) 1.0000000000 \text{ (.0035461 } \dagger \\ \underline{ .78539} \end{array}$$

$$\underline{\underline{.002785071479-}}$$

$$\begin{array}{r} 231) 1.00000000 \text{ (.004329-} \\ \underline{ .78539-} \end{array}$$

$$\underline{\underline{.00339995331}}$$

$$\begin{array}{r} 1.27324 \dagger \\ 282 \end{array}$$

$$\underline{\underline{359.05368}}$$

$$\begin{array}{r} 1.27324 \dagger \\ 231 \end{array}$$

$$\underline{\underline{294.11844.}}$$

I

Now

Now either of these Tables having their second Differences equal, may more readily be calculated by Interpolation, after the following Method; for to calculate it thus, would require much time and pains: Yet it will be necessary to examine your work at every Fifth Number, or where you doubt a mistake, the following Examples will illustrate the work more than many words.

A Table of *Area's* in Ale Gallons for Square Vessels.

Inches square	<i>Area's.</i>	1 Difference.	2 Difference.
1	0.0035461		
2	0.0141844	.106383	.70922
3	0.0319149	.177305	.70922
4	0.0567376	.248227	.70922
5	0.0886525	.319149	.70922
6	0.1276596	.390071	.70922
7	0.1737589	.460993	.70922
8	0.2269504	.531915	.70922
9	0.2872341	.602837	.70922
10	0.3546100	.673759	

A Table of *Area's* of Circles for Ale Gallons.

Inch. of Diams.	Circles <i>Area</i> .	1 Difference.	2 Difference.
1	0 . 0027851	.083553	
2	0 . 0111404	.139455	.55702
3	0 . 0250659	.194957	.55702
4	0 . 0445616	.250659	.55702
5	0 . 0696275	.306361	.55702
6	0 . 1002636	.362063	.55702
7	0 . 1364699	.417765	.55702
8	0 . 1782464	.473467	.55702
9	0 . 2255931	.529169	.55702
10	0 . 2785100		

A Table of *Area's* of Circles for Wine Gallons.

Inch. of Diams.	Circles <i>Area</i> .	1 Differ.	2 Differ.
1	0 . 0034		
2	0 . 0136	.102	.68
3	0 . 0306	.170	.68
4	0 . 0544	.138	.68
5	0 . 0850	.306	.68
6	0 . 1224	.374	.68
7	0 . 1666	.442	.68
8	0 . 2176	.510	.68
9	0 . 2754	.588	.68
10	0 . 3400	.646	

*The Construction of SYBRANT HANTZ
his Table of Area's of Segments of a Circle, ac-
cording to the Method used by my loving Friend
Henry Coley, a Person well versed in the Mathe-
matics.*

I. To the Logarithm of the Complement of the versed Sine to the Semi-diameter 500, &c. add this complicated Logarithm [9.301030] (*being the Arithmetical complement of the constant Semi-diameter .500 or 5000, &c.*) the Sum is the Co-sine of the Semi-angle at the Center.

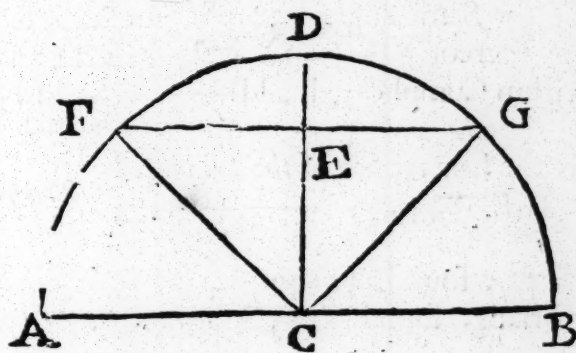
II. To the Logarithm of the whole Angle at the Center in degrees, and Decimal Minutes, add this Logarithm [9.443697] (*which is the complement Arithmetical of the Logarithm of 360 degrees defective.*) the Sum is the Logarithm of the Sector: For there is no need of either Area or Diameter, seeing they both are Unity.

III. To the Sine and Co-sine of the Semi-angle at the Centre, add this Logarithm, [1.502850] (*which is the Arithmetical complement of the Logarithm of .78539— (the Area of a Circle, whose Diameter is Unity)*) the Sum is the Logarithm of the Triangle; which subtracted from the Sector, leaves the Segment sought.

Note, That the whole Work must be Decimal Fractions, but wrought in whole Numbers, as is common: So that though they have a Characteristique before them, yet they must be supposed defective.

FIGURE

FIGURE XIV.



Let the versed Sine be D.E. .362.

Example

I.

Complement of D.E. the versed Sine }
to .500 is .138 Logarithm ——— } 0.1398791

Logarithm proper or Complicated add 9.301030

Sum is the Co-sine of the *Semi-angle*, }
at the Center F.C.G. $73^{\circ} .98'$. — } 9.440909

II.

Logarithm of the whole Angle at }
the Center F.C.G. $147^{\circ} .96'$. — } 2.170145.

Logarithm Complicated add ——— 9.443697.

Sum is the Logarithm of the *Sector* }
F.D.G.C. .41100 ——— } 1.613842.

I 3

III. Sine

III.

Sine of the Semi-angle $73^{\circ}.98'$ — 9.982805 .
 Co-sine thereof — 16.02 — 9.440909 .
 Logarithm Complicated add — 1.502850 .

Sum is the Logarithm of the Triangle } 0.926564
 F.C.G.E., $.8445$ — — — — — }

The Sector found $.41100$

The Triang. found $.8445$ Subtracted.

Rems — $.32655$ the Segment F.D.G.E
 as in the Table.

The use of the Table of *Segments*, consists principally in making a Practical and nigh Approximation, to the Gauging the *Empty Parts* of any *Wine, Brandy, Ale, or Oyl-Cask*, under the Four General Notions; *Spheroidal, Parabolical, Conical or Cylindrical*; the Liquor cutting the Cask's Head, and the Axe posited parallel to the Horizon, as shall be illustrated in the following examples: And is the best (*I suppose*) of this kind extant, though Mr. Street's for other uses may be better, there being this difference between them; Here the *Semi-diameter or Radius* is cut into 500 &c. equal parts; but Mr. Street cuts it into 1000: And whereas the *Area* of the whole in Mr. Streets is 3.141592 (viz.

(viz. *The Area of a Circle whose Diameter is 2.*)
 Here it is Unity, or 1 with 5 Cyphers: Now
 if you duly enter in each Table, viz. double in
 Mr. Streets to this, then it will be,

As 3.141592, the Circle in Mr. Streets.

To 1.00000, the Circle in this.

So is any Segment in Mr. Streets,

To the like in this, & *è contrà*.

Wherefore divide the Segment in Mr. Streets,
 by 3.141592, and by the Product multiply the
 Content of a Cask; the Product is the Content
 of the part, as in this. *Thus this Table is more
 ready for this work, whatever it may be for any
 other.*

An Example from Mr. Street's Table.

Let the Given Part of the *Radius* be .724, and
 the Segment thereto required.

	(Next lesser part in the Table is)	}	.19229.
	.720, against it stands the dif-		
	ference	}	— 4
The	Excess of .724, above .720, the		
	nearest lesser part is	}	7691.6
	Product the last Figure distin-		
	guished.		

[120]

Correction(found by Mediator and ex-} 6.7
 cels) substracted-----}

Remainder is—7684.9

Segm. of the versed Sine.720 parts is .1018202.

Sum is the Segment of .724-----.1025886.9

3.141592).1025887.00000(.32655+ Seg. as in
 942477 6 this Table.

8340940

6283184

20577560

18849552

17280080

15709960

15701200

15709960

Prob.

Probl. VI.

Having the Diameter of a Circle : To find the Segment correspondent to any part of the Diameter.

Figure 14.

Example.

Diameter of a Circle 240 Inches, and *D. E.* the versed Sine or Part given 15 : What is the *Area* of the Segment *F.D.G.F* ?

Diameter 240)	15.0000	(.0625=Versed Sine.
<i>Area</i> of a Circle, whose Diameter		
is 240 Inches is	_____	} 45239.04
.0625 Versed Sine per Table gives	_____	

Resp. The Segment *F.D.G.F.* is 1177.1198208

Prob.

Probl. VII.

Having a Cask's Dimensions, and Wet or Dry Inches : To find the vacuity or quantity of Remaining Liquor : If the Cask be taken as the Middle Frustum of a Spheroid, &c. the superficies of the Remaining Liquor cutting the Heads, and the Axe posited parallel to the Horizon : Or having the Dimensions, and the vacuity or quantity of Remaining Liquor : To find the Wet or Dry Inches.

Rule.

I. To the Wet or Dry Inches given, add Four Cyphers (the Diameter of the Circle in the Table, being supposed 10000) and divide it by the Bounding Diameter given, the Quotient is the Versed Sine ; Which found in the Table in some Column under the Title Versed Sine, against it in the next Column you have the Tabular Circles Segment, correspondent unto that of the Cask's Bounding Circle enquired of : Which
mul-

multiplied by the whole Content of the given Cask, the Product is the vacuity or quantity of Remaining Liquor (according to the purport of the Question :) And if the versed Sine found, be not in the Table, then take the Difference of Segments answerable to the nearest Greater and Lesser versed Sine, and multiply it by the excess of the Given Part above the said Lesser part (which excess is never more than 9) and distinguish or separate the last, or right hand figure from the rest by a point, or comma, adding the Remainder to the Segment answerable to the nearest Lesser versed Sine in the Table, the Sum shall be the Segment required.

The Converse.

II. *To the vacuity or quantity of Remaining Liquor, add Five Cyphers (the Area of the Circle in the Table being supposed 100000) and divide it by the whole Content of the given Cask; the Quotient is the Segment; which found in the*
Table

Table in some Column under the Title Segment, against it in the next Column you have the versed Sine of the Tabular Circles Segment, correspondent to that of the Cask's Bounding Circle inquired of: Which multiplied by the Cask's Bounding Diameter given, the Product is the Bounding Diameters Wet or Dry Inches (according to the tenour of the Question :) And if the Segment produced be not in the Table, then take the next Lesser in the Table, and observe their Difference and the versed Sine correspondent to the Lesser Segment; and also the Tabular Difference of Segments against it.

Then add a Cypher to your observed Difference, and divide it by the Tabular Difference, the Quotient added to the versed Sine correspondent to the Lesser Segment, the Sum shall be the versed Sine required.

Example I.

Let the versed Sine given be .3555 and the Segment thereto required.

The

{ Next lesser Versed Sine is .3550, }
 against it stands the Difference— } .112
 Excess of .3555 above .3550, the }
 next Lesser is ————— } —5
 The { Product, the last Figure distinguish. is 61.0
 Segm. of the versed Sine .3550 is .31800
 Sum is the Segment of .3555 — .31861

Example II.

Let the Segment given be .31861, and the versed Sine thereto required.

The { Segment given .31861
 Next Les. Seg. .31800 = .3550 versed Sine.

Tabular Differ. .122) 61.0 (—.5

The Segm. is .31861 equal to .3555 versed Sine.

Figure

Figure 13.

Question I.

Let c.d.e.D. be a London Beer Barrel, whose Boun^d Diameter is 23 Inches, each Head Diameter 19.9 Inches, and Length 27.4 Inches (according to Mr. PHILIP S;) and whole Content as Spheroidal 36.9853† Ale Gallons (found per TABLE:) How many Gallons are wanting in case A. g. the Boun^d Diameters Dry Inches be 8.78462 ?

Dry inches.

Boun^d Diameter 23) 8.78462 (.38194 = vers. Sine

The { Difference of Segments ————— .124
 { Excess above the next Lesser ————— .94

Product 2 figures cutoff ————— .116.56

.3810. Versed Sine per Table ——— .34993

Versed Sine .318194 = Segment ——— .35110.

Cask's whole Content ——— 36.9853†

Respons. Wanting Ale Gallons — 12.985538830

Figure

Figure 13.

Question I. inverted.

If 24 Ale Gallons remain in a Cask, whose whole Content, as Spheroidal, is 36.9853 + Ale Gallons and Bounding Diameter 23 Inches, how many are the Wet Inches, or what is the Quantity of g. B?

Whole cont.

36.9853 } 24.00000000 (.64890 Segment.

Next lesser Segment } .64883 = .6180 Versed Sine.
per Table ————

Tabular Difference .122). 7.00 (06

Segment .64890 is equal to — .61806 Versed Sine.
Cask's Bounding Diameter ———— 23 Inches.

Respons. The Wet Inches are ——— 14.21538.

Figure 13.

Question II.

A London Kilderkin's Bounding Diameter is 18.6 Inches, each Head Diameter 16.1 Inches, and Length 21.1 Inches (taken from Mr. PHILIPS for example sake) and whole Liquid Content, as Spheroidal, 20.12634 Ale Gallons (found per TABLE;) How many Gallons are wanting, when 5 Inches of the Bounding Diameter are Dry?

Bounding

[128]

Dry Inches.

Boung Diam. 18.6. (5.00000(.26882=verf. Sine.

The { Difference of Segments—.113
 { Excefs above the next Leffer. 82
 { Product 2 Figures difting. 92.66
 .2680 Verfed Sine per Table—.21558

Verfed Sine .26882=====21651 the Segment.
 Casks whole Content———20.12634†

Reffon. Wanting Ale Gallons 4.3575538734

Figure 13.

Question II. inverted.

If 15.76878, &c. Ale Gallons remain in a Cask, whose whole Content as Spheroidal is 20.12634† Ale Gallons, and Boung Diameter 18.6 Inches: How many are the Wet Inches?

Content Ullage.

20.12634)15.7687861266(.78349=Segment
 Next lefs per Table .78329.7310 verf. Sine.

Tabular Difference .113)20.00(18

Segm. .78349=the verfed Sine .73118
 Casks Boung Diameter———18.6

Reffon. The Wet Inches are——13.599948

Probl.

Probl. VIII.

Having a Cask's Dimensions, and Wet or Dry Inches: To find the vacuity or quantity of Remaining Liquor; If the Cask be taken as the Middle Frustum of a Parabolical Spindle, the superficies of the Remaining Liquor cutting the Heads, and the Axe posited parallel to the Horizon. Or having the Dimensions, and the vacuity or quantity of Remaining Liquor: To find the Wet or Dry Inches?

Rule.

By Problem V. Find the proposed Cask's whole Content as Parabolical: then finish the work as directed (Probl. VII.) for a Spheroidal Cask, and you will have your desire, without finding the Content or correspondent Frustum, as Spheroidal.

K

Figure

Figure 13.

Question I.

A London Beer Barrels Bounding Diameter 23 Inches; each Head Diameter 19.9 Inches; and Length 27.4 Inches; And whole Content as Parabolical (found per Table) 36.006 + Ale Gallons: How many Gallons are wanting, when 8.78462 Inches of the Bounding Diameter are Dry?

Bounding Diam. 23) 8.78462 (.38194 = versed Sine
 Versed Sine .38194 per Table } .35110.
 gives _____

Cask's whole Content _____ - 36.006.

Respon. Wanting Ale Gallons - 12.64170660

Figure 13.

Question I. inverted.

If 23.364 &c. Ale Gallons remain in a Cask, whose whole Content as Parabolical is 36.006 + Ale Gallons, and Bounding Diameter 23 Inches: How many are the Wet Inches?

Whole Cont.

36.006) 23.36429340 (.64890 = Segment.
 .64890 Segm. p. r Table = .61806 = Versed Sine.
 Cask's Bounding Diameter _____ 23.

Responf. The Wet Inches - 14.21538

Figure

Figure 13.

Question II.

A London Kilderkin's Bung Diameter 18.6 Inches, each Head Diameter 19.9 Inches, Length 27.4 Inches, and whole Content (found per Table) as Parabolical 19.6368— Ale Gallons: How many Gallons remain in this Cask, when 13.6 Inches are Wet?

Wet Inches.

Bung Diam. 18.6) 13.60000 (.73118 vers. Sine.
.73118 Vers. Sine per Table is = .78349 Segment.
Cask's whole Content ——— 19.6368 —

Resp. Remains in the Cask 15.385236432 Ale G.

Figure 13.

Question II. inverted.

If 15.385, &c. Ale Gallons remain in a Cask, whose whole Content as Parabolical is 19.6368 — Ale Gallons, and Bung Diameter 18.6 Inches: How many are the Wet Inches?

Whole Cont. Remain. Liquor.

19.6368) 15.385236432 (.78349 Segment
.78349 Segm. per Table is .73118 Verted. Sine.
Cask's Bung Diameter === 18.6 Inches.

Responf. The Wet Inches are 13.599948.

K 2

Probl.

Probl. IX.

Having a Cask's Dimensions, and Wet or Dry Inches : To find the vacuity or quantity of Remaining Liquor ; the Cask be taken as the Middle Frustum of Two Cones, abutting upon one Common Base, &c. the Superficies of the Remaining Liquor cutting the Heads, and the Ax posited parallel to the Horizon. Or having the Dimensions, and the vacuity or quantity of Remaining Liquor : To find the Wet or Dry Inches ?

Rule.

By Probl. V. Find the given Cask's whole Content, as the Middle Frustum of Two Cones, &c. then finish the work as directed Problem VII. for a Spheroidal Cask.

Figure 13.

Question I.

A London Beer Barrel's Bounding Diameter 23 Inches, each Head Diameter 19.9 Inches, Length 27.4 Inches; and whole Content as Conical (found per Table) 35.172— Ale Gallons: How many Gallons are wanting to fill up this Cask, when 8.78462 Inches of the Bounding Diameter are dry?

Dry Inches.

Bounding Diameter 23) 8.78462 (.38194 vers. Sine.
 .38194 versed Sine per Table is=.35110
 Cask's whole Content Ale Gallons=35.172—

Respon. Wanting Ale Gallons — 12.348880920

Figure 13.

Question I. inverted.

If 22.823 + Ale Gallons remain in a Cask, whose whole Content as Conical is 35.172 Ale Gallons, and Bounding Diameter 23 Inches: How many are the Wet Inches?

Whole Cont.

35.172) 22.82311980 (.64890 Segment.
 .64890 Seg. per Table=.61806 Versed Sine.
 Cask's Bounding Diameter=23 Inches.

Resp. The Wet Inches are 14.21538

K 3

Figure

Figure 13.

Question II.

A London Kilderkin's Bung Diameter 18.6 Inches, each Head Diameter 16.1 Inches, Length 21.1 Inches, and whole Content as Conical (found per Table) 18.85+ Ale Gallons: How many Gallons remain therein, when 5 Inches of the Bung Diameter are dry?

Wet Inches.

Bung Diam 18.6) 13.60000 (.73118 vers. Sine.
 .73118 vers. Sine per Table gives .78349 Segm.
 Cask's whole Content ——— 18.85 Ale Gal.

Respon. Remains in the Cask — 14.7687865

Figure 13.

Question II. inverted.

If 14.768, &c. Ale Gallons remain in a Cask, whose Bung Diameter is 18.6 Inches, and whole Content as Conical 18.85+ Ale Gallons: How many are the Wet Inches?

Whole Cont. 18.85) 14.7687865 (.78349 Segm.
 .78349 Segm. per Table is = .73118 vers. Sine.
 Cask's Bung Diameter ===== 18.6 Inches.

Respon. The Wet Inches are — 13.599948.

Prob.

Probl. X.

Having the Diameter of a Cylinder, and the Wet or Dry Inches: To find the vacuity or quantity of Remaining Liquour, the Superficies of the Remaining Liquor cutting the Heads, and the Ax posited parallel to the Horizon. Or having the Diameter, and the vacuity or quantity of Remaining Liquor: To find the Wet or Dry Inches?

Rule.

By Problem V. Find the given Cask's whole Content as Cylindrical, then finish the Work, as directed Problem VII. for a Spheroidal Cask.

Figure 13.

Question I.

A Cylindrical Cask's Diameter is 23 Inches, Length 27.4 Inches, and whole Content (found per Table) 40.36842 Ale Gallons: How many Gallons are wanting, when 8.78462 Inches of the Bottom Diameter are dry?

K 4

Diameter

Dry Inches.

Diameter at Base 23) 8.78462 (.38194 ver.Sine.
 .38194 Versed Sine *per* Table = .35110 Segment.
 Casks whole Content = 40.36842 Al. G.

Respon. Wanting Ale Gallons—14.1733522620

Figure 13.

Question I. inverted.

*If 26.195, &c. Ale Gallons remain in a Cask,
 whose whole Content as Cylindrical is 40.36842
 Ale Gallons, and Diameter at the Base 23 Inches:
 How many are the Wet Inches?*

Whole Cont,

40.36842) 26.1950677380 (.68490 Segment.
 .68490 Seg. *per* Tab. gives = .61806 Versed Sine,
 Cask's Diameter at the Base—23 Inches.

Respon. The Wet Inches are 14.21538

Figure 13.

Question II.

*A Cylindrical Cask's Diameter is 18.6 Inches,
Length 27.1 Inches, and whole Content 26.11536
Ale Gallons found per Table:) Now if 13.6 Inches
of the Diameter be Wet; How many Gallons re-
main in the Cask?*

Wet Inches.

Diameter 18.6) 13.60000 (.73118 Versed Sine.
.73118 per Table is====78349 Segment.
Cask's whole Content====26.11536 Ale Gal.

Resp. Remaining in the Cask 20.4597131244

Figure 13.

Question II. inverted.

*If 20.459, &c. Ale Gallons remain in a Cask,
whose whole Content as Cylindrical is 26.11536
Ale Gallons and Diameter at the Base 18.6 Inches :
How many are the Wet Inches ?*

Content

Content Remain. Liquor.

20.11536) 20.4597131244 (.78349 Segment.
 .78349 Segment per Table = .73118 vers. Sine.
 Diameter at the Base = 18.6

Respons. The Wet Inches are 13.599948

F I N I S.

T A B L E S
For the speedy
G A U G I N G
O F
B R E W E R S T U N S
A N D
C A S K S.

WITH
Many other Necessary Tables
for facilitating the Work.

By W. H.

L O N D O N :

Printed by J. D. for N. Ponder. 1673.

FIRST TABLE for Gauging of any
Square Tun, Back or Cooler, either
in Gallons, or in Beer or Ale Bar-
rels.

	Gallons	Beer Bar.	Ale Ba.
1	.00355	.0000985	.0001108
2	.00709	.0001970	.0002216
3	.01064	.0002955	.0003325
4	.01418	.0003940	.0004433
5	.01773	.0004925	.0005541
6	.02128	.0005910	.0006649
7	.02482	.0006895	.0007757
8	.02837	.0007880	.0008866
9	.03192	.0008865	.0009974
10	.03546	.0009850	.0011082
11	.03901	.0010835	.0012190
12	.04255	.0011820	.0013298
13	.04610	.0012805	.0014407
14	.04965	.0013790	.0015515
15	.05319	.0014775	.0016623
16	.05674	.0015760	.0017731
17	.06028	.0016746	.0018839
18	.06383	.0017731	.0019948
19	.06738	.0018716	.0021056
20	.07092	.0019701	.0022164

FIRST TABLE for Gauging of any
Square Tun, Back or Cooler, either
in Gallons, or in Beer or Ale Bar-
rels,

	Gallons	Beer Bar.	Ale Bar.
21	.07447	.0020686	.0023272
22	.07801	.0021671	.0024380
23	.08156	.0022656	.0025488
24	.08511	.0023641	.0026597
25	.08865	.0024626	.0027705
26	.09220	.0025611	.0028813
27	.09574	.0026596	.0029921
28	.09929	.0027581	.0031030
29	.10284	.0028566	.0032138
30	.10638	.0029551	.0033246
31	.10993	.0030536	.0034354
32	.11347	.0031521	.0035462
33	.11702	.0032506	.0036571
34	.12057	.0033491	.0037679
35	.12412	.0034476	.0038787
36	.12766	.0035461	.0039895
37	.13121	.0036446	.0041003
38	.13475	.0037431	.0042112
39	.13830	.0038416	.0043220
40	.14185	.0039401	.0044328

FIRST TABLE for Gauging of any
Square Tun, Back, or Coolet, either
in Gallons, or in Beer or Ale Bar-
rels.

	Gallon.	Beer Bar.	Ale Bar.
41	.14539	.0040386	.0045436
42	.14834	.0041371	.0046544
43	.15248	.0042356	.0047653
44	.15603	.0043341	.0048761
45	.15958	.0044326	.0049867
46	.16312	.0045311	.0050977
47	.16667	.0046296	.0052088
48	.17021	.0047281	.0053194
49	.17376	.0048266	.0054302
50	.17731	.0049251	.0055410
51	.18085	.0050237	.0056518
52	.18440	.0051222	.0057626
53	.18795	.0052207	.0058735
54	.19149	.0053192	.0059843
55	.19504	.0054177	.0060951
56	.19858	.0055162	.0062059
57	.20213	.0056147	.0063167
58	.20567	.0057132	.0064276
59	.20922	.0058117	.0065384
60	.21277	.0059102	.0066492

FIRST TABLE for Gauging of any Square Tun, Back or Cooler, either in Gallons, or in Beer or Ale Barrels.

	Gallon.	Beer Bar	Ale Bar.
61	.21631	.0060087	.0067600
62	.21986	.0061072	.0068708
63	.22340	.0062057	.0069817
64	.22695	.0063042	.0070925
65	.23050	.0064027	.0072033
66	.23405	.0065012	.0073141
67	.23759	.0065997	.0074249
68	.24113	.0066982	.0075358
69	.24468	.0067967	.0076466
70	.24823	.0068952	.0077574
71	.25177	.0069937	.0078682
72	.25532	.0070922	.0079790
73	.25886	.0071907	.0080899
74	.26241	.0072892	.0082007
75	.26596	.0073877	.0083115
76	.26950	.0074862	.0084223
77	.27305	.0075847	.0085331
78	.27660	.0076832	.0086440
79	.28014	.0077817	.0087548
80	.28369	.0078802	.0088656

FIRST TABLE for Gauging of any
Square Tun, Back or Cooler, either
in Gallons, or in Beer or Ale Bar-
rels.

	Gallon.	Beer Bar.	Ale Gal.
81	.28723	.0079787	.0089764
82	.29078	.0080772	.0090872
83	.29433	.0081757	.0091981
84	.29787	.0082743	.0093087
85	.30142	.0083728	.0094197
86	.30496	.0084713	.0095305
87	.30851	.0085698	.0096414
88	.31206	.0086683	.0097522
89	.31560	.0087668	.0098630
90	.31915	.0088653	.0099738
91	.32270	.0089638	.0100846
92	.32624	.0090623	.0101954
93	.32979	.0091608	.0103063
94	.33333	.0092593	.0104171
95	.33688	.0093578	.0105279
96	.34043	.0094563	.0106387
97	.34397	.0095548	.0107495
98	.34752	.0096533	.0108604
99	.35106	.0097518	.0109712
100	.35461	.0098503	.0110820

FIRST TABLE for Gauging of,
any Square Tun, Back or Cooler
either in Gallons, or in Beer or Ale
Barrels.

	Gallon.	Beer Bar.	Ale Bar.
101	.35815	.0099488	.0111928
102	.36170	.0100473	.0113036
103	.36524	.0101458	.0114144
104	.36879	.0102443	.0115252
105	.37234	.0103428	.0116360
106	.37588	.0104413	.0117468
107	.37943	.0105398	.0118576
108	.38298	.0106383	.0119684
109	.38652	.0107368	.0120792
110	.39006	.0108353	.0121900
111	.39361	.0109338	.0123000
112	.39715	.0110323	.0124116
113	.40070	.0111308	.0125224
114	.40425	.0112293	.0126332
115	.40779	.0113278	.0127440
116	.41134	.0114263	.0128548
117	.41489	.0115248	.0129656
118	.41844	.0116233	.0130764
119	.42198	.0117218	.0131872
120	.42553	.0118203	.0132980

FIRST TABLE for Gauging of
any Square Tun, Back or Cooler,
either in Gallons, or in Beer or Ale
Barrels.

	Gallon.	Beer Bar.	Ale Bar.
121	.42908	.0119188	.0134088
122	.43262	.0120173	.0135196
123	.43617	.0121158	.0136304
124	.43972	.0122143	.0137412
125	.44326	.0123128	.0138520
126	.44680	.0124113	.0139628
127	.45039	.0125098	.0140736
128	.45385	.0126083	.0141844
129	.4574	.0127068	.0142952
130	.46099	.0128053	.0144061
131	.46453	.0279038	.0145169
132	.46808	.0130023	.0146277
133	.47163	.0131008	.0147385
134	.47517	.0131993	.0148493
135	.47871	.0132978	.0149601
136	.48226	.0133963	.0150709
137	.48580	.0134948	.0151817
138	.48935	.0135933	.0152925
139	.49290	.0136918	.0154033
140	.49644	.0137903	.0155142

FIRST

FIRST TABLE for Gauging of
of any Square Tun, Back or Cooler,
either in Gallons, or in Beer or Ale
Barrels.

	Gallon.	Beer Bar.	Ale Bar.
141	.49999	.0138889	.0156250
142	.50354	.0139874	.0157358
143	.50708	.0140859	.0158466
144	.51063	.0141844	.0159574
145	.51417	.0142829	.0160682
146	.51772	.0143814	.0161790
147	.52127	.0144799	.0162898
148	.52481	.0145784	.0164006
149	.52836	.0146769	.0165114
150	.53190	.0147754	.0166223
151	.53545	.0148739	.0167331
152	.53900	.0149724	.0168430
153	.54254	.0150709	.0169547
154	.54609	.0151694	.0170655
155	.54963	.0152679	.0171763
156	.55318	.0153664	.0172871
157	.55673	.0154649	.0173979
158	.56027	.0155634	.0175087
159	.56382	.0156619	.0176195
160	.56737	.0157604	.0177304

FIRST TABLE for Gauging of
any Square Tun, Back or Cooler,
either in Gallons, or in Beer or Ale
Barrels.

	Gallon.	Beer Bar.	Ale Bar.
161	.57091	.0158589	.0178412
162	.57446	.0159574	.0179520
163	.57805	.0160559	.0180628
164	.58154	.0161544	.0181736
165	.58510	.0162529	.0182845
166	.58864	.0163514	.0183953
167	.59219	.0164497	.0185061
168	.59597	.0165484	.0186169
169	.59928	.0166469	.0187277
170	.60283	.0167454	.0188386
171	.60637	.0168439	.0189494
172	.60992	.0169424	.0190602
173	.61347	.0170409	.0191710
174	.61701	.0171394	.0192818
175	.62056	.0172379	.0193927
176	.62411	.0173364	.0195035
177	.62765	.0174349	.0196143
178	.63120	.0175334	.0197251
179	.63474	.0176319	.0198359
180	.63829	.0177305	.0199468

FIRST

FIRST TABLE for Gauging of
any Square Tun, Back or Cooler,
either in Gallons, or in Beer or Ale
Barrels.

	Gallon.	Beer Bar.	Ale Bar.
181	.64183	.0178291	.0200576
182	.64538	.0179276	.0201684
183	.64892	.0180261	.0202792
184	.65247	.0181246	.0203900
185	.65602	.0182231	.0205009
186	.65956	.0183216	.0206117
187	.66311	.0184201	.0207225
188	.66666	.0185186	.0208333
189	.67020	.0186171	.0209441
190	.67375	.0187156	.0210550
191	.67729	.0188141	.0211658
192	.68084	.0189126	.0212766
193	.68439	.0190111	.0213874
194	.68793	.0191096	.0214982
195	.69148	.0192081	.0216091
196	.69503	.0193066	.0217199
197	.69857	.0194051	.0218307
198	.70212	.0195036	.0219415
199	.70566	.0196021	.0220523
200	.70922	.0197006	.0221632

FIRST TABLE for Gauging of any
Square Tun, Back or Cooler, either
in Gallons, or in Beer or Ale Bar-
rels.

	Gallon.	Beer Bar.	Ale Bar.
201	.71276	.0197991	.0222740
202	.71631	.0198976	.0223848
203	.71985	.0199961	.0224956
204	.72340	.0200946	.0226064
205	.72695	.0201931	.0227173
206	.73049	.0202916	.0228281
207	.73404	.0203901	.0229389
208	.73759	.0204886	.0230497
209	.74113	.0205871	.0231605
210	.74468	.0206856	.0232713
211	.74822	.0207842	.0233821
212	.75177	.0208827	.0234929
213	.75532	.0209812	.0236037
214	.75886	.0210797	.0237145
215	.76241	.0211782	.0238254
216	.76596	.0212767	.0239362
217	.76950	.0213752	.0240470
218	.77305	.0214737	.0241578
219	.77659	.0215722	.0242686
220	.78014	.0216707	.0243794

FIRST

FIRST TABLE for Gauging of any
Square Tun, Back or Cooler, either
in Gallons, or in Beer or Ale Bar-
rels.

	Gallons	Beer Bar.	Ale Bar.
221	.78369	.0217692	.0244902
222	.78723	.0218677	.0246010
223	.79078	.0219662	.0247118
224	.79433	.0220647	.0248226
225	.79787	.0221632	.0249335
226	.80142	.0222617	.0250443
227	.80496	.0223602	.0251551
228	.80851	.0224587	.0252659
229	.81206	.0225572	.0253767
230	.81560	.0226557	.0254876
231	.81915	.0227542	.0255984
232	.82270	.0228527	.0257092
233	.82624	.0229512	.0258200
234	.82979	.0230497	.0259308
235	.83333	.0231482	.0260417
236	.83688	.0232467	.0261525
237	.84043	.0233452	.0262633
238	.84397	.0234437	.0263741
239	.84752	.0235422	.0264849
240	.85107	.0236407	.0265958

FIRST TABLE for Gauging of any
Square Tun, Back or Cooler, either
in Gallons, or in Beer or Ale Bar-
rels.

	Gallons	Beer Bar.	Ale Bar.
241	.85462	.0237393	.0267066
242	.85816	.0238378	.0268174
243	.86171	.0239363	.0269282
244	.86525	.0240348	.0270390
245	.86880	.0241333	.0271499
246	.87235	.0242318	.0272607
247	.87589	.0243303	.0273715
248	.87944	.0244288	.0274823
249	.88299	.0245273	.0275931
250	.88654	.0246258	.0277039
251	.89008	.0247243	.0278147
252	.89361	.0248228	.0279255
253	.89716	.0249213	.0280363
254	.90071	.0250198	.0281471
255	.90425	.0251183	.0282580
256	.90780	.0252168	.0283688
257	.91135	.0253153	.0284796
258	.91489	.0254138	.0285904
259	.91843	.0255123	.0287012
260	.92198	.0256108	.0288120

FIRST TABLE for Gauging of any
Square Tun, Back or Cooler, either
in Gallons, or in Beer or Ale Bar-
rels.

	Gallon.	Beer Bar.	Ale Bar.
261	.92552	.0257093	.0289228
262	.92907	.0258078	.0290336
263	.93262	.0259063	.0291444
264	.93616	.0260048	.0292552
265	.93971	.0261033	.0293661
266	.94326	.0262018	.0294769
267	.94681	.0263003	.0295877
268	.95035	.0263988	.0296985
269	.95390	.0264973	.0298093
270	.95744	.0265958	.0299201
271	.96099	.0266943	.0300310
272	.96454	.0267928	.0301418
273	.96808	.0268913	.0302526
274	.97163	.0269898	.0303634
275	.97517	.0270883	.0304743
276	.97872	.0271868	.0305851
277	.98226	.0272853	.0306959
278	.98581	.0273838	.0308067
279	.98935	.0274822	.0309175
280	.99290	.0275808	.0310284

FIRST TABLE for Gauging of any
Square Tun, Back, or Cooler, either
in Gallons, or in Beer or Ale Bar-
rels.

	Gallons.	Beer Bar.	Ale Bar.
281	0.99645	.0276793	.0311392
282	1.00000	.0277778	.0312500
283	1.00355	.0278763	.0313608
284	1.00709	.0279748	.0314716
285	1.01064	.0280733	.0315825
286	1.01418	.0281718	.0316933
287	1.01773	.0282703	.0318041
288	1.02128	.0283688	.0319149
289	1.02482	.0284673	.0320257
290	1.02837	.0285658	.0321366
291	1.03192	.0286643	.0322474
292	1.03546	.0287628	.0323582
293	1.03901	.0288613	.0324690
294	1.04255	.0289598	.0325798
295	1.04610	.0290583	.0326907
296	1.04965	.0291568	.0328015
297	1.05319	.0292553	.0329123
298	1.05674	.0293538	.0330231
299	1.06028	.0294523	.0331339
300	1.06383	.0295508	.0332447

FIRST

FIRST TABLE for Gauging of
any Square Tun, Back, or Cooler,
either in Gallons, or in Beer or Ale
Barrels.

	Gallons.	Beer Bar.	Ale Bar.
301	1.06738	.0296494	.0333555
302	1.07092	.0297479	.0334663
303	1.07447	.0298464	.0335771
304	1.07801	.0299449	.0336879
305	1.08156	.0300434	.0337988
306	1.08511	.0301419	.0339096
307	1.08865	.0302404	.0340204
308	1.09220	.0303389	.0341312
309	1.09574	.0304374	.0342420
310	1.09929	.0305359	.0343529
311	1.11284	.0306344	.0344637
312	1.10638	.0307329	.0345745
313	1.10993	.0308314	.0346853
314	1.11347	.0309299	.0347961
315	1.11702	.0310284	.0349070
316	1.12057	.0311269	.0350178
317	1.12412	.0312254	.0351286
318	1.12766	.0313239	.0352394
319	1.13121	.0314224	.0353502
320	1.13475	.0315209	.0354610

FIRST TABLE for Gauging of
any Square Tun, Back or Cooler,
either in Gallons, or in Beer or Ale
Barrels.

	Gallons.	Beer Bar.	Ale Bar.
321	1.13830	.0316194	.0355718
322	1.14184	.0317179	.0356826
323	1.14539	.0318164	.0357934
324	1.14834	.0319149	.0359042
325	1.15248	.0320134	.0360151
326	1.15603	.0321119	.0361259
327	1.15958	.0322104	.0362367
328	1.16312	.0323089	.0363475
329	1.16667	.0324074	.0364583
330	1.17021	.0325059	.0365692
331	1.17376	.0326044	.0366800
332	1.17731	.0327029	.0367908
333	1.18085	.0328014	.0369016
334	1.18440	.0328999	.0370124
335	1.18795	.0329984	.0371233
336	1.19149	.0330969	.0372341
337	1.19504	.0331955	.0373449
338	1.19858	.0332940	.0374557
339	1.20213	.0333925	.0375665
340	1.20567	.0334910	.0376774

FIRST TABLE for Gauging of
any Square Tun, Back or Cooler,
either in Gallons, or in Beer or Ale
Barrels.

	Gallons.	Beer Bar.	Ale Bar.
341	1.20922	.0335895	.0377882
342	1.21277	.0336880	.0378990
343	1.21631	.0337865	.0380098
344	1.21986	.0338850	.0381206
345	1.22340	.0339835	.0382315
346	1.22695	.0340820	.0383423
347	1.23050	.0341805	.0384531
348	1.23405	.0342790	.0385639
349	1.23759	.0343775	.0386747
350	1.24113	.0344760	.0387856
351	1.24468	.0345745	.0388964
352	1.24822	.0346730	.0390072
353	1.25177	.0347715	.0391180
354	1.25531	.0348700	.0392288
355	1.25886	.0349685	.0393396
356	1.26241	.0350670	.0394504
357	1.26596	.0351655	.0395612
358	1.26950	.0352640	.0396720
359	1.27305	.0353625	.0397828
360	1.27159	.0354610	.0398935

SECOND

SECOND TABLE for Gauging
of Square Tuns, &c. in Beer Barrels,
Firkins, Gallons, &c. one Inch deep.

0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$			
I.	S.	B.F.	G.	P.	B.	F.	G.	P.	B.	F.	G.	P.
1	0	0	0.00	0	0	0.01	0	0	0.01	0	0	0.01
2	0	0	0.01	0	0	0.02	0	0	0.02	0	0	0.03
3	0	0	0.03	0	0	0.04	0	0	0.04	0	0	0.05
4	0	0	0.06	0	0	0.06	0	0	0.07	0	0	0.08
5	0	0	0.09	0	0	0.10	0	0	0.11	0	0	0.12
6	0	0	0.13	0	0	0.14	0	0	0.15	0	0	0.16
7	0	0	0.17	0	0	0.19	0	0	0.20	0	0	0.21
8	0	0	0.23	0	0	0.24	0	0	0.26	0	0	0.27
9	0	0	0.29	0	0	0.30	0	0	0.32	0	0	0.34
10	0	0	0.35	0	0	0.36	0	0	0.39	0	0	0.41
11	0	0	0.43	0	0	0.45	0	0	0.47	0	0	0.49
12	0	0	0.51	0	0	0.53	0	0	0.56	0	0	0.58
13	0	0	0.60	0	0	0.62	0	0	0.65	0	0	0.67
14	0	0	0.70	0	0	0.72	0	0	0.75	0	0	0.77
15	0	0	0.80	0	0	0.83	0	0	0.85	0	0	0.88
16	0	0	0.91	0	0	0.94	0	0	0.97	0	0	1.00
17	0	0	1.03	0	0	1.06	0	0	1.09	0	0	1.12
18	0	0	1.15	0	0	1.18	0	0	1.21	0	0	1.25
19	0	0	1.28	0	0	1.31	0	0	1.35	0	0	1.38
20	0	0	1.42	0	0	1.45	0	0	1.49	0	0	1.53

SECOND

SECOND TABLE for Gauging
of Square Tuns, &c. in Ale Barrels,
Firkins, Gallons, &c. one Inch deep.

I. S.	0		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B	F|G.P	B|F	G.P	B|F	G.P	B	F G.P
1	00	0.00	00	0.01	00	0.01	00	0.01
2	00	0.01	00	0.02	00	0.02	00	0.03
3	00	0.03	00	0.04	00	0.04	00	0.05
4	00	0.06	00	0.06	00	0.07	00	0.08
5	00	0.09	00	0.10	00	0.11	00	0.12
6	00	0.13	00	0.14	00	0.15	00	0.16
7	00	0.17	00	0.19	00	0.20	00	0.21
8	00	0.23	00	0.24	00	0.26	00	0.27
9	00	0.29	00	0.30	00	0.32	00	0.34
10	00	0.35	00	0.36	00	0.39	00	0.41
11	00	0.43	00	0.45	00	0.47	00	0.49
12	00	0.51	00	0.53	00	0.56	00	0.58
13	00	0.60	00	0.62	00	0.65	00	0.67
14	00	0.70	00	0.72	00	0.75	00	0.77
15	00	0.80	00	0.83	00	0.85	00	0.85
16	00	0.91	00	0.94	00	0.97	00	1.00
17	00	1.03	00	1.06	00	1.09	00	1.12
18	00	1.15	00	1.18	00	1.21	00	1.25
19	00	1.28	00	1.31	00	1.35	00	1.38
20	00	1.42	00	1.45	00	1.49	00	1.53

SECOND

SECOND TABLE for Gauging
of Square Tuns, &c. in Beer Barrels,
Firkins, Gallons, &c. one Inch deep.

I. S.	0		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B	F|G.P.	B	F|G.P.	B	F|G.P.	B	F|G.P.
21	00	1.56	00	1.60	00	1.64	00	1.68
22	00	1.72	00	1.76	00	1.79	00	1.83
23	00	1.88	00	1.92	00	1.96	00	2.00
24	00	2.04	00	2.09	00	2.13	00	2.17
25	00	2.22	00	2.26	00	2.31	00	2.35
26	00	2.40	00	2.44	00	2.49	00	2.54
27	00	2.59	00	2.63	00	2.68	00	2.73
28	00	2.78	00	2.83	00	2.88	00	2.93
29	00	2.98	00	3.03	00	3.09	00	3.14
30	00	3.19	00	3.25	00	3.30	00	3.35
31	00	3.41	00	3.46	00	3.52	00	3.58
32	00	3.63	00	3.69	00	3.75	00	3.80
33	00	3.86	00	3.92	00	3.98	00	4.04
34	00	4.10	00	4.16	00	4.22	00	4.28
35	00	4.34	00	4.41	00	4.47	00	4.53
36	00	4.60	00	4.66	00	4.73	00	4.79
37	00	4.86	00	4.92	00	4.99	00	5.05
38	00	5.12	00	5.19	00	5.26	00	5.33
39	00	5.39	00	5.46	00	5.53	00	5.60
40	00	5.67	00	5.75	00	5.82	00	5.89

SECOND

SECOND TABLE for Gauging
of Square Tuns, &c. in Ale Barrels,
Firkins, Gallons, &c. one Inch deep.

I. S.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F|G. P		B	F|G. P		B	F|G. P		B	F|G. P	
21	00	1.56	00	1.60	00	1.64	00	1.68	00	1.83		
22	00	1.72	00	1.76	00	1.79	00	1.83	00	2.00		
23	00	1.88	00	1.92	00	1.96	00	2.00	00	2.17		
24	00	2.04	00	2.09	00	2.13	00	2.17	00	2.37		
25	00	2.22	00	2.26	00	2.31	00	2.37	00	2.54		
26	00	2.40	00	2.44	00	2.49	00	2.54	00	2.73		
27	00	2.59	00	2.63	00	2.68	00	2.73	00	2.93		
28	00	2.78	00	2.83	00	2.88	00	2.93	00	3.14		
29	00	2.98	00	3.03	00	3.09	00	3.14	00	3.35		
30	00	3.19	00	3.25	00	3.30	00	3.35	00	3.58		
31	00	3.41	00	3.46	00	3.52	00	3.58	00	3.80		
32	00	3.63	00	3.69	00	3.75	00	3.80	00	4.04		
33	00	3.86	00	3.92	00	3.98	00	4.04	00	4.28		
34	00	4.10	00	4.16	00	4.22	00	4.28	00	4.53		
35	00	4.34	00	4.41	00	4.47	00	4.53	00	4.79		
36	00	4.60	00	4.66	00	4.73	00	4.79	00	5.05		
37	00	4.86	00	4.92	00	4.99	00	5.05	00	5.33		
38	00	5.12	00	5.19	00	5.26	00	5.33	00	5.60		
39	00	5.39	00	5.46	00	5.53	00	5.60	00	5.89		
40	00	5.67	00	5.75	00	5.82	00	5.89	00			

SECOND TABLE for Gauging
of Square Tuns, &c. in Beer Barrels,
Firkins, Gallons, &c. one Inch deep.

I. S.	0		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B	F | G.P.	B	F | G.P.	B	F | G.P.	B	F | G.P.
41	0	0 | 5.96	0	0 | 6.03	0	0 | 6.11	0	0 | 6.18
42	0	0 | 6.26	0	0 | 6.33	0	0 | 6.41	0	0 | 6.48
43	0	0 | 6.57	0	0 | 6.63	0	0 | 6.71	0	0 | 6.79
44	0	0 | 6.87	0	0 | 6.94	0	0 | 7.02	0	0 | 7.10
45	0	0 | 7.18	0	0 | 7.26	0	0 | 7.34	0	0 | 7.42
46	0	0 | 7.50	0	0 | 7.59	0	0 | 7.67	0	0 | 7.75
47	0	0 | 7.83	0	0 | 7.92	0	0 | 8.00	0	0 | 8.09
48	0	0 | 8.17	0	0 | 8.26	0	0 | 8.34	0	0 | 8.43
49	0	0 | 8.52	0	0 | 8.60	0	0 | 8.69	0	0 | 8.78
50	0	0 | 8.87	0	0 | 8.95	0	0 | 9.04	0	1 | 0.13
51	0	1 | 0.22	0	1 | 0.31	0	1 | 0.41	0	1 | 0.50
52	0	1 | 0.59	0	1 | 0.68	0	1 | 0.77	0	1 | 0.87
53	0	1 | 0.96	0	1 | 1.05	0	1 | 1.15	0	1 | 1.24
54	0	1 | 1.34	0	1 | 1.44	0	1 | 1.53	0	1 | 1.63
55	0	1 | 1.73	0	1 | 1.83	0	1 | 1.92	0	1 | 2.02
56	0	1 | 2.12	0	1 | 2.22	0	1 | 2.32	0	1 | 2.42
57	0	1 | 2.52	0	1 | 2.62	0	1 | 2.73	0	1 | 2.83
58	0	1 | 2.93	0	1 | 3.03	0	1 | 3.14	0	1 | 3.24
59	0	1 | 3.35	0	1 | 3.45	0	1 | 3.56	0	1 | 3.66
60	0	1 | 3.77	0	1 | 3.87	0	1 | 3.98	0	1 | 4.09

SECOND

SECOND TABLE for Gauging
of Square Tuns, &c. in Ale Barrels,
Firkins, Gallons, &c. one Inch deep.

I. S.	0		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B	F|G.P.	B	F|G.P.	B	F|G.P.	B	F|G.P.
41	0	0 5.96	0	0 6.03	0	0 6.11	0	0 6.18
42	0	0 6.26	0	0 6.33	0	0 6.41	0	0 6.48
43	0	0 6.57	0	0 6.63	0	0 6.71	0	0 6.79
44	0	0 6.87	0	0 6.94	0	0 7.02	0	0 7.10
45	0	0 7.18	0	0 7.26	0	0 7.34	0	0 7.45
46	0	0 7.50	0	0 7.59	0	0 7.67	0	0 7.75
47	0	0 7.83	0	0 7.92	0	1 0.00	0	1 0.09
48	0	1 0.17	0	1 0.26	0	1 0.34	0	1 0.43
49	0	1 0.52	0	1 0.60	0	1 0.69	0	1 0.78
50	0	1 0.87	0	1 0.95	0	1 1.04	0	1 1.13
51	0	1 1.22	0	1 1.31	0	1 1.41	0	1 1.50
52	0	1 1.59	0	1 1.68	0	1 1.77	0	1 1.87
53	0	1 1.96	0	1 2.05	0	1 2.15	0	1 2.24
54	0	1 2.34	0	1 2.44	0	1 2.53	0	1 2.63
55	0	1 2.73	0	1 2.83	0	1 2.92	0	1 3.02
56	0	1 3.12	0	1 3.22	0	1 3.32	0	1 3.42
57	0	1 3.52	0	1 3.62	0	1 3.73	0	1 3.83
58	0	1 3.93	0	1 4.03	0	1 4.14	0	1 4.24
59	0	1 4.35	0	1 4.45	0	1 4.56	0	1 4.66
60	0	1 4.77	0	1 4.87	0	1 4.98	0	1 5.09

SECOND TABLE for Gauging
of Square Tuns, &c. in Beer Barrels,
Firkins, Gallons, &c. one Inch deep.

I. S.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
61	0	1	4.20	0	1	4.31	0	1	4.41	0	1	4.52
62	0	1	4.63	0	1	4.74	0	1	4.85	0	1	4.96
63	0	1	5.07	0	1	5.19	0	1	5.30	0	1	5.41
64	0	1	5.52	0	1	5.64	0	1	5.75	0	1	5.87
65	0	1	5.98	0	1	6.10	0	1	6.21	0	1	6.33
66	0	1	6.45	0	1	6.56	0	1	6.68	0	1	6.80
67	0	1	6.92	0	1	7.04	0	1	7.16	0	1	7.28
68	0	1	7.40	0	1	7.52	0	1	7.64	0	1	7.76
69	0	1	7.88	0	1	8.01	0	1	8.13	0	1	8.25
70	0	1	8.38	0	1	8.50	0	1	8.62	0	1	8.75
71	0	1	8.88	0	2	0.00	0	2	0.13	0	2	0.26
72	0	2	0.38	0	2	0.51	0	2	0.64	0	2	0.77
73	0	2	0.90	0	2	1.03	0	2	1.16	0	2	1.29
74	0	2	1.42	0	2	1.59	0	2	1.68	0	2	1.81
75	0	2	1.95	0	2	2.09	0	2	2.21	0	2	2.35
76	0	2	2.48	0	2	2.62	0	2	2.75	0	2	2.89
77	0	2	3.03	0	2	3.16	0	2	3.30	0	2	3.44
78	0	2	3.57	0	2	3.71	0	2	3.85	0	2	3.99
79	0	2	4.13	0	2	4.27	0	2	4.41	0	2	4.55
80	0	2	4.70	0	2	4.84	0	2	4.98	0	2	5.12

FIRST

SECOND TABLE for Gauging of
of Square Tuns, &c. in Ale Barrels,
Firkins, Gallons, &c. one Inch deep.

0			$\frac{1}{2}$			$\frac{1}{2}$			$\frac{3}{4}$		
I.	S.	B|F|G.P.	I.	S.	B|F|G.P.	I.	S.	B|F|G.P.	I.	S.	B|F|G.P.
61	0	1 5.20	0	1	5.31	0	1	5.41	0	1	5.52
62	0	1 5.63	0	1	5.74	0	1	5.85	0	1	5.96
63	0	1 6.07	0	1	6.19	0	1	6.30	0	1	6.41
64	0	1 6.52	0	1	6.64	0	1	6.75	0	1	6.87
65	0	1 6.98	0	1	7.10	0	1	7.21	0	1	7.33
66	0	1 7.45	0	1	7.56	0	1	7.68	0	1	7.80
67	0	1 7.92	0	2	0.04	0	2	0.16	0	2	0.28
68	0	2 0.40	0	2	0.52	0	2	0.64	0	2	0.76
69	0	2 0.88	0	2	1.01	0	2	1.13	0	2	1.25
70	0	2 1.38	0	2	1.50	0	2	1.62	0	2	1.75
71	0	2 1.88	0	2	2.00	0	2	2.13	0	2	2.26
72	0	2 2.38	0	2	2.51	0	2	2.64	0	2	2.77
73	0	2 2.90	0	2	3.03	0	2	3.16	0	2	3.29
74	0	2 3.42	0	2	3.59	0	2	3.68	0	2	3.81
75	0	2 3.95	0	2	4.09	0	2	4.21	0	2	4.35
76	0	2 4.48	0	2	4.62	0	2	4.75	0	2	4.89
77	0	2 5.03	0	2	5.16	0	2	5.30	0	2	5.44
78	0	2 5.57	0	2	5.71	0	2	5.85	0	2	5.99
79	0	2 6.13	0	2	6.27	0	2	6.41	0	2	6.55
80	0	2 6.70	0	2	6.84	0	2	6.98	0	2	7.12

SECOND TABLE for Gauging
of Square Tun, &c. in Beer Barrels,
Firkins, Gallons, &c. one Inch deep,

I.S.	0				$\frac{1}{2}$				$\frac{1}{2}$				$\frac{3}{4}$		
	B	F	G.P.		B	F	G.P.		B	F	G.P.		B	F	G.P.
81	0	2	5.27	0	25.41	0	25.55	0	2	5.70	0	2	5.70		
82	0	2	5.84	0	25.98	0	26.14	0	2	6.28	0	2	6.28		
83	0	2	6.43	0	26.58	0	26.72	0	2	6.87	0	2	6.87		
84	0	2	7.02	0	27.17	0	27.32	0	2	7.47	0	2	7.47		
85	0	2	7.62	0	27.77	0	27.92	0	2	8.07	0	2	8.07		
86	0	2	8.23	0	28.38	0	28.53	0	2	8.69	0	2	8.69		
87	0	2	8.84	0	28.99	0	30.15	0	3	0.30	0	3	0.30		
88	0	3	0.46	0	30.62	0	30.77	0	3	0.93	0	3	0.93		
89	0	3	1.09	0	31.25	0	31.41	0	3	1.56	0	3	1.56		
90	0	3	1.72	0	31.88	0	32.04	0	3	2.20	0	3	2.20		
91	0	3	2.37	0	32.53	0	32.69	0	3	2.85	0	3	2.85		
92	0	3	3.02	0	33.18	0	33.34	0	3	3.51	0	3	3.51		
93	0	3	3.67	0	33.84	0	34.00	0	3	4.17	0	3	4.17		
94	0	3	4.33	0	34.50	0	34.67	0	3	4.84	0	3	4.84		
95	0	3	5.00	0	35.17	0	35.34	0	3	5.51	0	3	5.51		
96	0	3	5.68	0	35.85	0	36.02	0	3	6.19	0	3	6.19		
97	0	3	6.37	0	36.54	0	36.71	0	3	6.88	0	3	6.88		
98	0	3	7.06	0	37.23	0	37.41	0	3	7.58	0	3	7.58		
99	0	3	7.76	0	37.93	0	38.11	0	3	8.28	0	3	8.28		
100	0	3	8.46	0	38.64	0	38.82	0	3	8.99	0	3	8.99		

SECOND

SECOND TABLE for Gauging
of Square Tuns, &c. in Ale Barrels,
Firkins, Gallons, &c. one Inch deep.

I. S.	0			$\frac{1}{2}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G. P.	B	F	G. P.	B	F	G. P.	B	F	G. P.
81	0	2	7.27	0	2	7.41	0	2	7.55	0	2	7.70
82	0	2	7.84	0	2	7.98	0	3	0.14	0	3	0.28
83	0	3	0.43	0	3	0.58	0	3	0.72	0	3	0.87
84	0	3	1.02	0	3	1.17	0	3	1.32	0	3	1.47
85	0	3	1.62	0	3	1.77	0	3	1.92	0	3	2.07
86	0	3	2.23	0	3	2.38	0	3	2.53	0	3	2.69
87	0	3	2.84	0	3	2.99	0	3	3.15	0	3	3.30
88	0	3	3.46	0	3	3.62	0	3	3.77	0	3	3.93
89	0	3	4.09	0	3	4.25	0	3	4.41	0	3	4.56
90	0	3	4.72	0	3	4.88	0	3	5.04	0	3	5.20
91	0	3	5.37	0	3	5.53	0	3	5.69	0	3	5.85
92	0	3	6.02	0	3	6.18	0	3	6.34	0	3	6.51
93	0	3	6.67	0	3	6.84	0	3	7.00	0	3	7.17
94	0	3	7.33	0	3	7.50	0	3	7.67	0	3	7.84
95	1	0	0.00	1	0	0.17	1	0	0.34	1	0	0.51
96	1	0	0.68	1	0	0.85	1	0	1.02	1	0	1.19
97	1	0	1.37	1	0	1.54	1	0	1.71	1	0	1.88
98	1	0	2.06	1	0	2.23	1	0	2.41	1	0	2.58
99	1	0	2.76	1	0	2.93	1	0	3.11	1	0	3.28
100	1	0	3.46	1	0	3.64	1	0	3.82	1	0	3.99

SECOND TABLE for Gauging
of Square Tuns, &c. in Beer Barrels,
Firkins, Gallons, &c. one Inch deep.

I. S.	0.		$\frac{1}{2}$		$\frac{2}{3}$		$\frac{4}{3}$	
	B	F|G.P.	B	F|G.P.	B	F|G.P.	B	F|G.P.
101	10	0.17	10	0.35	10	0.53	10	0.71
102	10	0.89	10	1.08	10	1.26	10	1.44
103	10	1.62	10	1.80	10	1.99	10	2.17
104	10	2.36	10	2.54	10	2.73	10	2.91
105	10	3.10	10	3.28	10	3.47	10	3.66
106	10	3.84	10	4.03	10	4.22	10	4.41
107	10	4.60	10	4.80	10	4.98	10	5.17
108	10	5.36	10	5.55	10	5.75	10	5.94
109	10	6.13	10	6.33	10	6.52	10	6.71
110	10	6.91	10	7.10	10	7.30	10	7.50
111	10	7.69	10	7.89	10	8.09	10	8.28
112	10	8.48	10	8.68	10	8.88	11	0.08
113	11	0.28	11	0.48	11	0.68	11	0.88
114	11	1.09	11	1.29	11	1.49	11	1.70
115	11	1.90	11	2.10	11	2.31	11	2.51
116	11	2.72	11	2.92	11	3.13	11	3.34
117	11	3.54	11	3.75	11	3.96	11	4.17
118	11	4.38	11	4.59	11	4.79	11	5.00
119	11	5.22	11	5.44	11	5.64	11	5.85
120	11	6.06	11	6.28	11	6.49	11	6.71

SECOND

SECOND TABLE for Gauging
of Square Tuns, &c. in Ale Barrels,
Firkins, Gallons, &c. one Inch deep.

I. S.	0		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B	F|G.P	B	F|G.P.	B	F|G.P.	B	F|G.P
101	10	4.17	10	4.35	10	4.53	10	4.71
102	10	4.89	10	5.08	10	5.26	10	5.44
103	10	5.62	10	5.80	10	5.99	10	6.17
104	10	6.36	10	6.54	10	6.73	10	6.91
105	10	7.10	10	7.28	10	7.47	10	7.66
106	10	7.84	11	0.03	11	0.22	11	0.41
107	11	0.60	11	0.80	11	0.98	11	1.17
108	11	1.36	11	1.55	11	1.75	11	1.94
109	11	2.13	11	2.33	11	2.52	11	2.71
110	11	2.91	11	3.10	11	3.30	11	3.50
111	11	3.69	11	3.89	11	4.09	11	4.28
112	11	4.48	11	4.68	11	4.88	11	5.08
113	11	5.28	11	5.48	11	5.68	11	5.88
114	11	6.09	11	6.29	11	6.49	11	6.70
115	11	6.90	11	7.10	11	7.31	11	7.51
116	11	7.72	11	7.92	12	0.13	12	0.34
117	12	0.54	12	0.75	12	0.96	12	1.17
118	12	1.38	12	1.59	12	1.79	12	2.00
119	12	2.22	12	2.44	12	2.64	12	2.85
120	12	3.06	12	3.28	12	3.49	12	3.71

SECOND

SECOND TABLE for Gauging
of Square Tuns, &c., in Beer Barrels,
Firkins, Gallons, &c. one Inch deep.

I. S.	0			$\frac{1}{2}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
121	1	1	6.92	1	1	7.13	1	1	7.35	1	1	7.57
122	1	1	7.78	1	1	8.00	1	1	8.22	1	1	8.43
123	1	1	8.65	1	1	8.87	1	2	0.09	1	2	0.31
124	1	2	0.53	1	2	0.75	1	2	0.97	1	2	1.19
125	1	2	1.41	1	2	1.63	1	2	1.85	1	2	2.08
126	1	2	2.30	1	2	2.52	1	2	2.75	1	2	2.97
127	1	2	3.20	1	2	3.42	1	2	3.65	1	2	3.87
128	1	2	4.10	1	2	4.33	1	2	4.56	1	2	4.78
129	1	2	5.01	1	2	5.24	1	2	5.47	1	2	5.70
130	1	2	5.93	1	2	6.16	1	2	6.39	1	2	6.62
131	1	2	6.85	1	2	7.09	1	2	7.32	1	2	7.55
132	1	2	7.79	1	2	8.02	1	2	8.26	1	2	8.49
133	1	2	8.73	1	2	8.96	1	3	0.20	1	3	0.44
134	1	3	0.67	1	3	0.91	1	3	1.15	1	3	1.39
135	1	3	1.63	1	3	1.87	1	3	2.11	1	3	2.35
136	1	3	2.59	1	3	2.83	1	3	3.07	1	3	3.31
137	1	3	3.58	1	3	3.80	1	3	4.04	1	3	4.29
138	1	3	4.53	1	3	4.78	1	3	5.02	1	3	5.27
139	1	3	5.51	1	3	5.76	1	3	6.01	1	3	6.26
140	1	3	6.50	1	3	6.75	1	3	7.00	1	3	7.25

SECOND

SECOND TABLE for Gauging
of Square Tuns, &c. in Ale Barrels,
Firkins, Gallons, &c. one Inch deep.

I. S.	0		$\frac{1}{2}$		$\frac{1}{2}$		$\frac{1}{2}$	
	B	F|G.P.	B	F|G.P.	B	F|G.P.	B	F|G.P.
121	12	3.92	12	4.13	12	4.35	12	4.57
122	12	4.78	12	5.00	12	5.22	12	5.43
123	12	5.65	12	5.87	12	6.09	12	6.31
124	12	6.53	12	6.75	12	6.97	12	7.19
125	12	7.41	12	7.63	12	7.85	13	0.08
126	13	0.30	13	0.52	13	0.75	13	0.97
127	13	1.20	13	1.42	13	1.65	13	1.87
128	13	2.10	13	2.33	13	2.56	13	2.78
129	13	3.01	13	3.24	13	3.47	13	3.70
130	13	3.93	13	4.16	13	4.39	13	4.62
131	13	4.85	13	5.09	13	5.32	13	5.55
132	13	5.79	13	6.02	13	6.26	13	6.49
133	13	6.73	13	6.96	13	7.20	13	7.44
134	13	7.67	13	7.91	20	0.15	20	0.39
135	20	0.63	20	0.87	20	1.11	20	1.35
136	20	1.59	20	1.83	20	2.07	20	2.31
137	20	2.58	20	2.80	20	3.04	20	3.29
138	20	3.53	20	3.74	20	4.02	20	4.27
139	20	4.51	20	4.76	20	5.01	20	5.26
140	20	5.50	20	5.75	20	6.00	20	6.25

SECOND TABLE for Gauging
of Square Tuns, &c. in Beer Barrels,
Firkins, Gallons, &c. one Inch deep.

I.S.	0		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B	F|G.P.	B	F|G.P.	B	F|G.P.	B	F|G.P.
141	13	7.50	13	7.75	13	8.00	13	8.25
142	13	8.50	13	8.75	20	0.01	20	0.26
143	20	0.52	20	0.77	20	1.02	20	1.28
144	20	1.53	20	1.79	20	2.05	20	2.30
145	20	2.56	20	2.82	20	3.07	20	3.33
146	20	3.59	20	3.85	20	4.11	20	4.37
147	20	4.63	20	4.89	20	5.15	20	5.41
148	20	5.68	20	5.94	20	6.20	20	6.46
149	20	6.73	20	6.99	20	7.26	20	7.52
150	20	7.79	20	8.05	20	8.32	20	8.59
151	20	8.86	20	0.12	21	0.39	21	0.66
152	21	0.93	20	1.20	21	1.47	21	1.74
153	21	2.01	20	2.28	21	2.56	21	2.83
154	21	3.10	20	3.37	21	3.65	21	3.92
155	21	4.20	20	4.47	21	4.75	21	5.02
156	21	5.30	20	5.58	21	5.85	21	6.13
157	21	6.41	20	6.69	21	6.97	21	7.25
158	21	7.53	20	7.81	21	8.09	21	8.37
259	21	8.65	20	8.93	22	0.22	22	0.50
160	22	0.78	22	1.07	22	1.35	22	1.63

SECOND

SECOND TABLE for Gauging
of Square Tuns, &c. in Ale Barrels,
Firkins, Gallons, &c. one Inch deep.

I.S.	0		$\frac{1}{3}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B|F	G.P.	B|F	G.P.	B|F	G.P.	B|F	G.P.
141	2 0	6.50	2 0	6.75	2 0	7.00	2 0	7.25
142	2 0	7.50	2 0	7.75	2 1	0.01	2 1	0.26
143	2 1	0.52	2 1	0.77	2 1	1.02	2 1	1.28
144	2 1	1.53	2 1	1.79	2 1	2.05	2 1	2.30
145	2 1	2.56	2 1	2.82	2 1	3.07	2 1	3.33
146	2 1	3.59	2 1	3.85	2 1	4.11	2 1	4.37
147	2 1	4.63	2 1	4.89	2 1	5.15	2 1	5.41
148	2 1	5.68	2 1	5.94	2 1	6.20	2 1	6.46
149	2 1	6.73	2 1	6.99	2 1	7.26	2 1	7.52
150	2 1	7.79	2 2	0.05	2 2	0.32	2 2	0.59
151	2 2	0.86	2 2	1.12	2 2	1.39	2 2	1.66
152	2 2	1.93	2 2	2.20	2 2	2.47	2 2	2.74
153	2 2	3.01	2 2	3.28	2 2	3.56	2 2	3.83
154	2 2	4.10	2 2	4.37	2 2	4.65	2 2	4.92
155	2 2	5.20	2 2	5.47	2 2	5.75	2 2	6.02
156	2 2	6.30	2 2	6.58	2 2	6.85	2 2	7.13
157	2 2	7.41	2 2	7.69	2 2	7.97	2 3	0.25
158	2 3	0.53	2 3	0.81	2 3	1.09	2 3	1.37
159	2 3	1.65	2 3	1.93	2 3	2.22	2 3	2.50
160	2 3	2.78	2 3	3.07	2 3	3.35	2 3	3.63

SECOND

SECOND TABLE for Gauging
of Square Tuns, &c. in Beer Barrels,
Firkins, Gallons, &c. one Inch deep.

I.S.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
161	2	2	1.92	2	2	2.20	2	2	2.49	2	2	2.79
162	2	2	3.07	2	2	3.35	2	2	3.64	2	2	3.93
163	2	2	4.22	2	2	4.51	2	2	4.80	2	2	5.10
164	2	2	5.38	2	2	5.67	2	2	5.96	2	2	6.25
165	2	2	6.55	2	2	6.84	2	2	7.13	2	2	7.43
166	2	2	7.71	2	2	8.02	2	2	8.31	2	2	8.61
167	2	2	8.90	2	3	0.20	2	3	0.49	2	3	0.79
168	2	3	1.09	2	3	1.39	2	3	1.68	2	3	1.98
169	2	3	2.28	2	3	2.58	2	3	2.88	2	3	3.18
170	2	3	3.48	2	3	4.78	2	3	4.09	2	3	4.39
171	2	3	4.69	2	3	5.00	2	3	5.30	2	3	5.60
172	2	3	5.91	2	3	6.21	2	3	6.52	2	3	6.83
173	2	3	7.13	2	3	7.44	2	3	7.75	2	3	8.05
174	2	3	8.36	2	3	8.67	2	3	8.98	3	0	0.29
175	3	0	0.60	3	0	0.91	3	0	1.22	3	0	1.53
176	3	0	1.84	3	0	2.16	3	0	2.47	3	0	2.78
177	3	0	3.10	3	0	3.41	3	0	3.72	3	0	4.04
178	3	0	4.35	3	0	4.67	3	0	4.99	3	0	5.30
179	3	0	5.62	3	0	5.94	3	0	6.26	3	0	6.58
180	3	0	6.89	3	0	7.21	3	0	7.53	3	0	7.85

SECOND

SECOND TABLE for Gauging
of Square Tuns, &c. in Ale Barrels,
Firkins, Gallons, &c. one Inch deep.

I. S.	0		$\frac{1}{2}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B|F|	G.P.	B|F|	G.P.	B|F|	G.P.	B|F|	G.P.
161	2|3|	3.92	2|3|	4.20	2|3|	4.49	2|3|	4.79
162	2|3|	5.07	2|3|	5.35	2|3|	5.64	2|3|	5.93
163	2|3|	6.22	2|3|	6.51	2|3|	6.80	2|3|	7.10
164	2|3|	7.38	2|3|	7.67	2|3|	7.96	3|0|	0.25
165	3|0|	0.55	3|0|	0.84	3|0|	1.13	3|0|	1.43
166	3|0|	1.72	3|0|	2.02	3|0|	2.31	3|0|	2.61
167	3|0|	2.90	3|0|	3.20	3|0|	3.49	3|0|	3.79
168	3|0|	4.09	3|0|	4.39	3|0|	4.68	3|0|	4.98
169	3|0|	5.28	3|0|	5.58	3|0|	5.88	3|0|	6.18
170	3|0|	6.48	3|0|	6.78	3|0|	7.09	3|0|	7.39
171	3|0|	7.69	3|1|	0.00	3|1|	0.30	3|1|	0.60
172	3|1|	0.91	3|1|	1.21	3|1|	1.52	3|1|	1.83
173	3|1|	2.13	3|1|	2.44	3|1|	2.75	3|1|	3.05
174	3|1|	3.36	3|1|	3.67	3|1|	3.98	3|1|	4.29
175	3|1|	4.60	3|1|	4.91	3|1|	5.22	3|1|	5.53
176	3|1|	5.84	3|1|	6.16	3|1|	6.47	3|1|	6.78
177	3|1|	7.10	3|1|	7.41	3|1|	7.72	3|2|	0.04
178	3|2|	0.35	3|2|	0.67	3|2|	0.99	3|2|	1.30
179	3|2|	1.62	3|2|	1.94	3|2|	2.26	3|2|	2.58
180	3|2|	2.89	3|2|	3.21	3|2|	3.53	3|2|	3.85

SECOND

SECOND TABLE for Gauging
of Square Tuns, &c. in Beer Barrels;
Firkins, Gallons, &c. one Inch deep.

I.S.	0		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B	F|G.P.	B	F|G.P.	B	F|G.P.	B	F|G.P.
181	3	0 8.17	3	0 8.50	3	0 8.82	3	1 0.14
182	3	1 0.46	3	1 0.78	3	1 1.11	3	1 1.43
183	3	1 1.76	3	1 2.08	3	1 2.41	3	1 2.73
184	3	1 3.06	3	1 3.38	3	1 3.71	3	1 4.04
185	3	1 4.37	3	1 4.69	3	1 5.02	3	1 5.35
186	3	1 5.68	3	1 6.01	3	1 6.34	3	1 6.67
187	3	1 7.00	3	1 7.33	3	1 7.67	3	1 8.00
188	3	1 8.33	3	1 8.67	3	2 0.00	3	2 0.33
189	3	2 0.67	3	2 1.01	3	2 1.34	3	2 1.68
190	3	2 2.01	3	2 2.35	3	2 2.69	3	2 3.03
191	3	2 3.36	3	2 3.70	3	2 4.02	3	2 4.38
192	3	2 4.72	3	2 5.06	3	2 5.41	3	2 5.75
193	3	2 6.10	3	2 6.43	3	2 6.78	3	2 7.12
194	3	2 7.46	3	2 7.81	3	2 8.15	3	2 8.50
195	3	2 8.84	3	3 0.19	3	3 0.53	3	3 0.88
196	3	3 1.23	3	3 1.58	3	3 1.93	3	3 2.27
197	3	3 2.62	3	3 2.97	3	3 3.32	3	3 3.67
198	3	3 4.02	3	3 4.37	3	3 4.73	3	3 5.08
199	3	3 5.43	3	3 5.78	3	3 6.14	3	3 6.49
200	3	3 6.84	3	3 7.20	3	3 7.55	3	3 7.91

SECOND

SECOND TABLE for Gauging
of Square Tuns, &c. in Ale Barrels,
Firkins, Gallons, &c. one Inch deep.

	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
I. S.	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
181	3	2	4.17	3	2	4.50	3	2	4.82	3	2	5.14
182	3	2	5.46	3	2	5.78	3	2	6.11	3	2	6.43
183	3	2	6.76	3	2	7.08	3	2	7.41	3	2	7.73
184	3	3	0.06	3	3	0.38	3	3	0.71	3	3	1.04
185	3	3	1.37	3	3	1.69	3	3	2.01	3	3	2.35
186	3	3	2.68	3	3	3.01	3	3	3.34	3	3	3.67
187	3	3	4.00	3	3	4.33	3	3	4.67	3	3	5.00
188	3	3	5.33	3	3	5.67	3	3	6.00	3	3	6.33
189	3	3	6.67	3	3	7.01	3	3	7.34	3	3	7.68
190	4	0	0.01	3	4	0.35	4	0	0.69	4	0	1.03
191	4	0	1.36	4	0	1.70	4	0	2.02	4	0	2.38
192	4	0	2.72	4	0	3.06	4	0	3.41	4	0	3.75
193	4	0	4.10	4	0	4.43	4	0	4.78	4	0	5.12
194	4	0	5.46	4	0	5.81	4	0	6.15	4	0	6.50
195	4	0	6.84	4	0	7.19	4	0	7.53	4	0	7.88
196	4	1	0.23	4	1	0.58	4	1	0.93	4	1	1.27
197	4	1	1.62	4	1	1.97	4	1	2.32	4	1	2.67
198	4	1	3.02	4	1	3.37	4	1	3.73	4	1	4.08
199	4	1	4.43	4	1	4.78	4	1	5.14	4	1	5.49
200	4	1	5.84	4	1	6.20	4	1	6.55	4	1	6.91

SECOND TABLE for Gauging
of Square Tuns, &c. in Beer Barrels,
Firkins, Gallons, &c. one Inch deep.

	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
I.S.	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
201	3	3	8.27	3	3	8.62	3	3	8.98	4	0	0.34
202	4	0	0.70	4	0	1.05	4	0	1.41	4	0	1.77
203	4	0	2.13	4	0	2.49	4	0	2.85	4	0	3.21
204	4	0	3.57	4	0	3.94	4	0	4.30	4	0	4.66
205	4	0	5.02	4	0	5.39	4	0	5.75	4	0	6.12
206	4	0	6.48	4	0	6.85	4	0	7.22	4	0	7.58
207	4	0	7.95	4	0	8.32	4	0	8.68	4	1	0.05
208	4	1	0.42	4	1	0.79	4	1	1.16	4	1	1.53
209	4	1	1.90	4	1	2.27	4	1	2.64	4	1	3.01
210	4	1	3.38	4	1	3.76	4	1	4.13	4	1	4.50
211	4	1	4.88	4	1	5.25	4	1	5.63	4	1	6.00
212	4	1	6.38	4	1	6.75	4	1	7.13	4	1	7.51
213	4	1	7.88	4	1	8.26	4	1	8.64	4	2	0.02
214	4	2	0.40	4	2	0.78	4	2	1.16	4	2	1.54
215	4	2	1.92	4	2	2.30	4	2	2.68	4	2	3.06
216	4	2	3.45	4	2	3.83	4	2	4.21	4	2	5.60
217	4	2	4.98	4	2	5.37	4	2	5.75	4	2	6.14
218	4	2	6.53	4	2	6.91	4	2	7.30	4	2	7.69
219	4	2	8.08	4	2	8.46	4	2	8.85	4	3	0.23
220	4	3	0.63	4	3	1.02	4	3	1.41	4	3	1.80

SECOND TABLE for Gauging
of Square Tuns, &c. in Ale Barrels,
Firkins, Gallons, &c. one Inch deep.

I. S.	0		B|F|G.P.	$\frac{1}{2}$		B|F|G.P.	$\frac{1}{2}$		B|F|G.P.	$\frac{1}{4}$		B|F|G.P.
	B|F|G.P.	B|F|G.P.		B|F|G.P.	B|F|G.P.		B|F|G.P.	B|F|G.P.		B|F|G.P.	B|F|G.P.	
201	4 1	7.27	4 1	7.62	4 1	7.98	4 2	0.34	4 2	0.34	4 2	0.34
202	4 2	0.70	4 2	1.05	4 2	1.41	4 2	1.77	4 2	1.77	4 2	1.77
203	4 2	2.13	4 2	2.49	4 2	2.85	4 2	3.21	4 2	3.21	4 2	3.21
204	4 2	3.57	4 2	3.94	4 2	4.30	4 2	4.66	4 2	4.66	4 2	4.66
205	4 2	5.02	4 2	5.39	4 2	5.75	4 2	6.12	4 2	6.12	4 2	6.12
206	4 2	6.48	4 2	6.85	4 2	7.22	4 2	7.58	4 2	7.58	4 2	7.58
207	4 2	7.95	4 3	0.32	4 3	0.68	4 3	1.05	4 3	1.05	4 3	1.05
208	4 3	1.42	4 3	1.79	4 3	2.16	4 3	2.53	4 3	2.53	4 3	2.53
209	4 3	2.90	4 3	3.27	4 3	3.64	4 3	4.01	4 3	4.01	4 3	4.01
210	4 3	4.38	4 3	4.76	4 3	5.13	4 3	5.50	4 3	5.50	4 3	5.50
211	4 3	5.88	4 3	6.25	4 3	6.63	4 3	7.00	4 3	7.00	4 3	7.00
212	4 3	7.38	4 3	7.75	5 0	0.13	5 0	0.51	5 0	0.51	5 0	0.51
213	5 0	0.88	5 0	1.26	5 0	1.64	5 0	2.02	5 0	2.02	5 0	2.02
214	5 0	2.40	5 0	2.78	5 0	3.16	5 0	3.54	5 0	3.54	5 0	3.54
215	5 0	3.92	5 0	4.30	5 0	4.68	5 0	5.06	5 0	5.06	5 0	5.06
216	5 0	5.45	5 0	5.83	5 0	6.21	5 0	6.60	5 0	6.60	5 0	6.60
217	5 0	6.98	5 0	7.37	5 0	7.75	5 1	0.14	5 1	0.14	5 1	0.14
218	5 1	0.53	5 1	0.91	5 1	1.30	5 1	1.69	5 1	1.69	5 1	1.69
219	5 1	2.08	5 1	2.46	5 1	2.85	5 1	3.22	5 1	3.22	5 1	3.22
220	5 1	3.63	5 1	4.02	5 1	4.41	5 1	4.80	5 1	4.80	5 1	4.80

SECOND TABLE for Gauging
of Square Tuns, &c. in Beer Barrels,
Firkins, Gallons, &c. one Inch deep.

I. S.	0		$\frac{1}{2}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B	F|G. P	B	F|G. P	B	F|G. P	B	F|G. P.
221	43	2.20	43	2.59	43	2.98	43	3.37
222	43	3.77	43	4.16	43	4.55	43	4.95
223	43	5.34	43	5.74	43	6.14	43	6.53
224	43	6.93	43	7.33	43	7.72	43	8.12
225	43	8.52	43	8.92	50	0.32	50	0.72
226	50	1.12	50	1.52	50	1.92	50	2.32
227	50	2.73	50	3.13	50	3.53	50	3.94
228	50	4.34	50	4.75	50	5.15	50	5.56
229	50	5.96	50	6.37	50	6.78	50	7.18
230	50	7.59	50	8.00	50	8.41	50	8.81
231	51	0.22	51	0.63	51	1.04	51	1.46
232	51	1.87	51	2.28	51	2.69	51	3.10
233	51	3.52	51	3.93	51	4.34	51	4.76
234	51	5.17	51	5.59	51	6.00	51	6.42
235	51	6.84	51	7.25	51	7.67	51	8.09
236	51	8.50	51	8.92	52	0.39	52	0.76
237	52	1.18	52	1.60	52	2.02	52	2.44
238	52	2.86	52	3.29	52	3.71	52	4.13
239	52	4.56	52	4.98	52	5.41	52	5.83
240	52	6.26	52	6.68	52	7.11	52	7.53

SECOND TABLE for Gauging
of Square Tuns, &c. in Ale Barrels,
Firkins, Gallons, &c. one Inch deep.

I.S.	0		B|F|G.P.	1		B|F|G.P.	2		B|F|G.P.	3		B|F|G.P.	4		B|F|G.P.
	B|F	G.P.		B|F	G.P.		B|F	G.P.		B|F	G.P.				
221	5	1	5.20	5	1	5.59	5	1	5.98	5	1	6.37	5	1	6.76
222	5	1	6.27	5	1	7.16	5	1	7.55	5	1	7.95	5	1	8.34
223	5	2	0.34	5	2	0.74	5	2	1.14	5	2	1.53	5	2	1.93
224	5	2	1.93	5	2	2.33	5	2	2.72	5	2	3.12	5	2	3.52
225	5	2	3.52	5	2	3.92	5	2	4.32	5	2	4.72	5	2	5.12
226	5	2	5.12	5	2	5.52	5	2	5.92	5	2	6.32	5	2	6.72
227	5	2	6.73	5	2	7.13	5	2	7.53	5	2	7.94	5	2	8.34
228	5	3	0.34	5	3	0.75	5	3	1.15	5	3	1.56	5	3	1.96
229	5	3	1.96	5	3	2.37	5	3	2.78	5	3	3.18	5	3	3.59
230	5	3	3.59	5	3	4.00	5	3	4.41	5	3	4.81	5	3	5.22
231	5	3	5.22	5	3	5.63	5	3	6.04	5	3	6.46	5	3	6.87
232	5	3	6.87	5	3	7.28	5	3	7.69	6	0	0.10	6	0	0.52
233	6	0	0.52	6	0	0.93	6	0	1.34	6	0	1.76	6	0	2.17
234	6	0	2.17	6	0	2.59	6	0	3.00	6	0	3.42	6	0	3.84
235	6	0	3.84	6	0	4.25	6	0	4.67	6	0	5.09	6	0	5.50
236	6	0	5.50	6	0	5.92	6	0	6.34	6	0	6.76	6	0	7.18
237	6	0	7.18	6	0	7.60	6	1	0.02	6	1	0.44	6	1	0.86
238	6	1	0.86	6	1	1.29	6	1	1.71	6	1	2.13	6	1	2.56
239	6	1	2.56	6	1	2.98	6	1	3.41	6	1	3.83	6	1	4.26
240	6	1	4.26	6	1	4.68	6	1	5.11	6	1	5.53	6	1	5.95

SECOND TABLE for Gauging
of Square Tuns, &c. in Beer Barrels,
Firkins, Gallons, &c. one Inch deep.

0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
I. S.	B. F.	G. P.	B. F.	G. P.	B. F.	G. P.	B. F.	G. P.	B. F.	G. P.	
241	5 2	7.96	5 2	8.39	5 2	8.82	5 3	0.25			
242	5 3	0.67	5 3	1.10	5 3	1.53	5 3	1.96			
243	5 3	2.39	5 3	2.83	5 3	3.26	5 3	3.69			
244	5 3	4.12	5 3	4.55	5 3	4.99	5 3	5.42			
245	5 3	5.86	5 3	6.29	5 3	6.73	5 3	7.16			
246	5 3	7.60	5 3	8.03	5 3	8.47	5 3	8.90			
247	6 0	0.34	6 0	0.78	6 0	1.22	6 0	1.66			
248	6 0	2.10	6 0	2.54	6 0	2.98	6 0	3.42			
249	6 0	3.86	6 0	4.30	6 0	4.74	6 0	5.18			
250	6 0	5.63	6 0	6.07	6 0	6.52	6 0	6.96			
251	6 0	7.41	6 0	7.85	6 0	8.30	6 0	8.74			
252	6 1	0.19	6 1	0.63	6 1	1.08	6 1	1.53			
253	6 1	1.98	6 1	2.43	6 1	2.88	6 1	3.33			
254	6 1	3.78	6 1	4.23	6 1	4.68	6 1	5.13			
255	6 1	5.58	6 1	6.03	6 1	6.48	6 1	6.93			
256	6 1	7.39	6 1	7.84	6 1	8.30	6 1	8.75			
257	6 2	0.21	6 2	0.66	6 2	1.12	6 2	1.58			
258	6 2	2.04	6 2	2.50	6 2	2.95	6 2	3.42			
259	6 2	3.87	6 2	4.33	6 2	4.79	6 2	5.25			
260	6 2	5.71	6 2	6.17	6 2	6.63	6 2	7.09			

SECOND

SECOND TABLE for Gauging
of Square Tuns, &c. in Ale Barrels,
Firkins, Gallons, &c. one Inch deep.

	0			$\frac{1}{2}$			$\frac{1}{2}$			$\frac{3}{4}$		
I.S.	B|F|G.P.			B|F|G.P.			B|F|G.P.			B|F|G.P.		
241	6|1|5.64	6	1	6.39	6	1	6.82	6	1	7.25		
242	6|1|2.67	6	2	0.10	6	2	0.53	6	2	0.96		
243	6|2|1.39	6	2	1.83	6	2	2.26	6	2	2.69		
244	6|2|3.12	6	2	3.55	6	2	3.99	6	2	4.42		
245	6|2|4.86	6	2	5.29	6	2	5.73	6	2	6.17		
246	6|2|6.60	6	2	7.03	6	2	7.47	6	2	7.90		
247	6|3|0.34	6	3	0.78	6	3	1.22	6	3	1.66		
248	6|3|2.10	6	3	2.54	6	3	2.98	6	3	3.42		
249	6|3|3.86	6	3	4.30	6	3	4.74	6	3	5.18		
250	6|3|5.62	6	3	6.07	6	3	6.52	6	3	6.96		
251	6|3|7.41	6	3	7.85	7	0	0.30	7	0	0.74		
252	7|0|1.19	7	0	1.63	7	0	2.08	7	0	2.53		
253	7|0|2.98	7	0	3.43	7	0	3.88	7	0	4.33		
254	7|0|4.78	7	0	5.23	7	0	5.68	7	0	6.13		
255	7|0|6.58	7	0	7.03	7	0	7.48	7	0	7.93		
256	7|1|0.39	7	1	0.84	7	1	1.30	7	1	1.75		
257	7|1|2.21	7	1	2.66	7	1	3.12	7	1	3.58		
258	7|1|4.04	7	1	4.50	7	1	4.95	7	1	5.42		
259	7|1|5.87	7	1	6.33	7	1	6.79	7	1	7.25		
260	7|1|7.71	7	2	0.17	7	2	0.62	7	2	1.09		

SECOND TABLE for Gauging
of Square Tuns, &c. in Beer Barrels,
Firkins, Gallons, &c. one Inch deep.

L. S.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
261	6	2	7.55	6	2	8.01	6	2	8.48	6	2	8.94
262	6	3	0.41	6	3	0.87	6	3	1.34	6	3	1.80
263	6	3	2.27	6	3	2.73	6	3	3.20	6	3	3.67
264	6	3	4.14	6	3	4.61	6	3	5.08	6	3	5.55
265	6	3	6.01	6	3	6.48	6	3	6.95	6	3	7.42
266	6	3	7.90	6	3	8.37	6	3	8.85	7	0	0.32
267	7	0	0.80	7	0	1.27	7	0	1.74	7	0	2.21
268	7	0	2.69	7	0	3.17	7	0	3.64	7	0	4.12
269	7	0	4.59	7	0	5.07	7	0	5.55	7	0	6.03
270	7	0	6.51	7	0	6.99	7	0	7.48	7	0	7.96
271	7	0	8.45	7	0	8.93	7	1	0.41	7	1	0.89
272	7	1	1.37	7	1	1.85	7	1	2.33	7	1	2.81
273	7	1	3.30	7	1	3.78	7	1	4.26	7	1	4.75
274	7	1	5.24	7	1	5.72	7	1	6.21	7	1	6.70
275	7	1	7.19	7	1	7.67	7	1	8.16	7	1	8.65
276	7	2	0.14	7	2	0.63	7	2	1.12	7	2	1.61
277	7	2	2.10	7	2	2.59	7	2	3.08	7	2	3.57
278	7	2	4.06	7	2	4.55	7	2	5.04	7	2	5.53
279	7	2	6.03	7	2	6.52	7	2	7.02	7	2	7.51
280	7	2	8.01	7	2	8.50	7	3	0.00	7	3	0.50

SECOND

SECOND TABLE for Gauging
of Square Tuns, &c. in Ale Barrels.
Firkins, Gallons, &c. one Inch deep.

I. S.	0		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B	F|G.P.	B|F	G.P.	B|F	G.P.	B|F	G.P.
261	7|2	1.55	7|2	2.01	7|2	2.48	7|	2.94
262	7|2	3.41	7|2	3.87	7|2	4.34	7|2	4.80
263	7|2	5.27	7|2	5.73	7|2	6.20	7|2	6.67
264	7|2	7.14	7|2	7.61	7|3	0.08	7|3	0.55
265	7|3	1.01	7|3	1.48	7|3	1.95	7|3	2.42
266	7|3	2.90	7|3	3.37	7|3	3.85	7|3	4.32
267	7|3	4.80	7|3	5.27	7|3	5.74	7|3	6.21
268	7|3	6.69	7|3	7.17	7|3	7.64	8|0	0.12
269	8|0	0.59	8|0	1.07	8|0	1.55	8|0	2.03
270	8|0	2.51	8|0	2.99	8|0	8.48	8|0	3.96
271	8|0	4.45	8|0	4.93	8|0	5.41	8|0	5.89
272	8|0	6.37	8|0	6.85	8|0	7.33	8|0	7.81
273	8|1	0.30	8|1	0.78	8|1	0.26	8|1	0.75
274	8|1	2.24	8|1	2.72	8|1	3.21	8|1	3.70
275	8|1	4.19	8|1	4.67	8|1	5.16	8|1	5.65
276	8|1	6.14	8|1	6.63	8|1	7.12	8|1	7.61
277	8|2	0.10	8|2	0.59	8|2	1.08	8|2	1.57
278	8|2	2.06	8|2	2.55	8|2	3.04	8|2	3.53
279	8|2	4.03	8|2	4.52	8|2	5.02	8|2	5.51
280	8|2	6.01	8|2	6.50	8|2	7.00	8|2	7.50

SECOND

SECOND TABLE for Gauging
of Square Tuns, &c. in Beer Barrels,
Firkins, Gallons, &c. one Inch deep.

I. S.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
281	7	3	1.00	7	3	1.50	7	3	2.00	7	3	2.50
282	7	3	3.00	7	3	3.50	7	3	4.00	7	3	4.50
283	7	3	5.00	7	3	5.50	7	3	6.00	7	3	6.50
284	7	3	7.01	7	3	7.51	7	3	8.01	7	3	8.52
285	8	0	0.03	8	0	0.53	8	0	1.04	8	0	1.54
286	8	0	2.05	8	0	2.55	8	0	3.06	8	0	3.57
287	8	0	4.08	8	0	4.59	8	0	5.19	8	0	5.69
288	8	0	6.12	8	0	6.63	8	0	7.14	8	0	7.65
289	8	0	8.17	8	0	8.68	8	1	0.20	8	1	0.71
290	8	1	1.23	8	1	1.74	8	1	2.26	8	1	2.77
291	8	1	3.28	8	1	3.89	8	1	4.32	8	1	4.84
292	8	1	5.37	8	1	5.88	8	1	6.40	8	1	6.91
293	8	1	7.43	8	1	7.95	8	1	8.47	8	1	8.99
294	8	2	0.52	8	2	1.04	8	2	1.56	8	2	2.08
295	8	2	2.61	8	2	3.13	8	2	3.66	8	2	4.18
296	8	2	4.71	8	2	5.23	8	2	5.76	8	2	6.28
297	8	2	6.81	8	2	7.33	8	2	7.86	8	2	8.39
298	8	2	8.92	8	3	0.44	8	3	0.97	8	3	1.50
299	8	3	2.03	8	3	2.56	8	3	3.09	8	3	3.62
300	8	3	4.15	8	3	4.68	8	3	5.21	8	3	5.75

SECOND

SECOND TABLE for Gauging
of Square Tuns, &c. in Ale Barrels,
Firkins, Gallons, &c. one Inch deep.

I.S.	0		1		2		3	
	B	F	G	P.	B	F	G	P.
281	8	3	0.00		8	3	0.50	
282	8	3	2.00		8	3	2.50	
283	8	3	4.00		8	3	4.50	
284	8	3	6.01		8	3	6.51	
285	9	0	0.03		9	0	0.53	
286	9	0	2.05		9	0	2.55	
287	9	0	4.08		9	0	4.59	
288	9	0	6.12		9	0	6.63	
289	9	1	0.17		9	1	0.68	
290	9	1	2.23		9	1	2.74	
291	9	1	4.28		9	1	4.80	
292	9	1	6.37		9	1	6.88	
293	9	2	0.43		9	2	0.95	
294	9	2	2.52		9	2	3.04	
295	9	2	4.61		9	2	5.13	
296	9	2	6.71		9	2	7.23	
297	9	3	0.81		9	3	1.33	
298	9	3	2.92		9	3	3.44	
299	9	3	5.03		9	3	5.56	
300	9	3	7.15		9	3	7.68	
					10	0	0.21	10
								0.75

CIRCLES

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**CIRCLES AREA'S in Beer
Barrels, Firkins, Gallons, &c. twelve
Inches.**

I.D.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
1	0	0	0.03	0	0	0.06	0	0	0.08	0	0	0.10
2	0	0	0.13	0	0	0.16	0	0	0.20	0	0	0.26
3	0	0	0.30	0	0	0.36	0	0	0.42	0	0	0.48
4	0	0	0.54	0	0	0.62	0	0	0.68	0	0	0.76
5	0	0	0.86	0	0	0.92	0	0	1.00	0	0	1.10
6	0	0	1.22	0	0	1.30	0	0	1.42	0	0	1.52
7	0	0	1.64	0	0	1.76	0	0	1.88	0	0	2.00
8	0	0	2.14	0	0	2.28	0	0	2.42	0	0	2.56
9	0	0	2.70	0	0	2.86	0	0	3.02	0	0	3.18
10	0	0	3.34	0	0	3.50	0	0	3.68	0	0	3.86
11	0	0	4.04	0	0	4.22	0	0	4.42	0	0	4.62
12	0	0	4.82	0	0	5.02	0	0	5.22	0	0	5.42
13	0	0	5.64	0	0	5.86	0	0	6.05	0	0	6.32
14	0	0	6.56	0	0	6.80	0	0	7.04	0	0	7.28
15	0	0	7.52	0	0	7.78	0	0	8.02	0	0	8.30
16	0	0	8.56	0	0	8.84	0	1	0.12	0	1	0.38
17	0	1	0.66	0	1	0.98	0	1	1.24	0	1	1.54
18	0	1	1.82	0	1	2.12	0	1	2.44	0	1	2.74
19	0	1	3.06	0	1	3.38	0	1	3.70	0	1	4.02
20	0	1	4.36	0	1	4.70	0	1	5.04	0	1	5.38

CIRCLES

CIRCLES AREA'S in Ale
Barrels, Firkins, Gallons, &c. twelve
Inches.

I.D.	0			$\frac{1}{2}$			$\frac{1}{2}$			$\frac{1}{2}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
1	0	0	0.03	0	0	0.06	0	0	0.08	0	0	0.10
2	0	0	0.13	0	0	0.16	0	0	0.20	0	0	0.26
3	0	0	0.30	0	0	0.36	0	0	0.42	0	0	0.48
4	0	0	0.54	0	0	0.62	0	0	0.68	0	0	0.76
5	0	0	0.86	0	0	0.92	0	0	1.00	0	0	1.10
6	0	0	1.22	0	0	1.30	0	0	1.42	0	0	1.52
7	0	0	1.64	0	0	1.76	0	0	1.88	0	0	2.00
8	0	0	2.14	0	0	2.28	0	0	2.42	0	0	2.56
9	0	0	2.70	0	0	2.86	0	0	3.02	0	0	3.18
10	0	0	3.34	0	0	3.50	0	0	3.68	0	0	3.86
11	0	0	4.04	0	0	4.22	0	0	4.42	0	0	4.62
12	0	0	4.82	0	0	5.02	0	0	5.22	0	0	5.42
13	0	0	5.64	0	0	5.86	0	0	6.05	0	0	6.32
14	0	0	6.56	0	0	6.80	0	0	7.04	0	0	7.28
15	0	0	7.52	0	0	7.78	0	1	0.02	0	1	0.30
16	0	1	0.56	0	1	0.84	0	1	1.12	0	1	1.38
17	0	1	1.66	0	1	1.98	0	1	2.24	0	1	2.54
18	0	1	2.82	0	1	3.12	0	1	3.44	0	1	3.74
19	0	1	4.06	0	1	4.38	0	1	4.70	0	1	5.02
20	0	1	5.36	0	1	5.70	0	1	6.04	0	1	6.38

CIRCLES

CIRCLES AREAS in Beer Barrels, Firkins, Gallons, &c. twelve Inches.

T.D.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
21	0	1	5.74	0	1	6.12	0	1	6.48	0	1	6.84
22	0	1	7.22	0	1	7.58	0	1	7.94	0	1	8.30
23	0	1	8.68	0	2	0.08	0	2	0.48	0	2	0.88
24	0	2	1.26	0	2	1.66	0	2	2.06	0	2	2.46
25	0	2	2.88	0	2	3.32	0	2	3.74	0	2	4.18
26	0	2	4.60	0	2	5.04	0	2	5.48	0	2	5.92
27	0	2	6.36	0	2	6.82	0	2	7.28	0	2	7.74
28	0	2	8.20	0	2	8.66	0	3	0.14	0	3	0.62
29	0	3	1.10	0	3	1.58	0	3	2.08	0	3	2.58
30	0	3	3.08	0	3	3.58	0	3	4.10	0	3	4.60
31	0	3	5.12	0	3	5.66	0	3	6.18	0	3	6.70
32	0	3	7.22	0	3	7.76	0	3	8.30	0	3	8.84
33	1	0	0.40	1	0	0.96	1	0	1.52	1	0	2.08
34	1	0	2.64	1	0	3.22	1	0	3.80	1	0	4.38
35	1	0	4.94	1	0	5.54	1	0	6.14	1	0	6.74
36	1	0	7.32	1	0	7.92	1	0	8.54	1	0	9.18
37	1	1	0.76	1	1	1.40	1	1	2.02	1	1	2.66
38	1	1	3.26	1	1	3.90	1	1	4.54	1	1	5.18
39	1	1	5.84	1	1	6.50	1	1	7.16	1	1	7.82
40	1	1	8.48	1	2	0.16	1	2	0.84	1	2	1.52

CIRCLES

CIRCLES AREA'S in Ale Barrels, Firkins, Gallons, &c. twelve Inches.

I.D.	0			$\frac{1}{2}$			$\frac{1}{3}$			$\frac{1}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
21	0	1	6.74	0	1	7.12	0	1	7.48	0	1	7.84
22	0	2	0.22	0	2	0.58	0	2	0.94	0	2	1.30
23	0	2	1.68	0	2	2.08	0	2	2.48	0	2	2.88
24	0	2	3.26	0	2	3.66	0	2	4.06	0	2	4.46
25	0	2	4.88	0	2	5.32	0	2	5.74	0	2	6.18
26	0	2	6.60	0	2	7.04	0	2	7.48	0	2	7.92
27	0	3	0.36	0	3	0.82	0	3	1.28	0	3	1.74
28	0	3	2.20	0	3	2.66	0	3	3.14	0	3	3.62
29	0	3	4.10	0	3	4.58	0	3	5.08	0	3	5.58
30	0	3	6.08	0	3	6.58	0	3	7.10	0	3	7.10
31	1	0	0.12	1	0	0.66	1	0	1.18	1	0	1.70
32	1	0	2.22	1	0	2.76	1	0	3.30	1	0	3.84
33	1	0	4.40	1	0	4.96	1	0	5.52	1	0	6.68
34	1	0	6.84	1	0	7.22	1	0	7.80	1	1	0.38
35	1	1	0.94	1	1	1.54	1	1	2.14	1	1	2.74
36	1	1	3.32	1	1	3.92	1	1	4.54	1	1	5.18
37	1	1	5.76	1	1	6.40	1	1	7.02	1	1	7.66
38	1	2	0.26	1	2	0.90	1	2	1.54	1	2	2.18
39	1	2	2.84	1	2	3.50	1	2	4.16	1	2	4.82
40	1	2	5.48	1	2	6.16	1	2	6.84	1	2	7.52

CIRCLES

CIRCLES AREA'S in Beer Barrels, Firkins, Gallons, &c. twelve Inches.

I.D.	0		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B	F	G	P	B	F	G	P
41	1	2	2.18		1	2	2.43	
42	1	2	4.84		1	2	5.66	
43	1	2	7.80		1	2	8.52	
44	1	3	1.70		1	3	2.44	
45	1	3	4.66		1	3	5.42	
46	1	3	7.74		1	3	8.50	
47	2	0	1.82		2	0	2.60	
48	2	0	5.00		2	0	5.80	
49	2	0	8.24		2	1	0.06	
50	2	1	2.54		2	1	3.38	
51	2	1	5.92		2	1	6.78	
52	2	2	0.38		2	2	1.24	
53	2	2	3.86		2	2	4.76	
54	2	2	7.46		2	2	8.36	
55	2	3	2.10		2	3	3.02	
56	2	3	5.80		2	3	6.74	
57	3	0	0.58		3	0	1.54	
58	3	0	4.42		3	0	5.40	
59	3	0	8.34		3	1	0.32	
60	3	1	3.30		3	1	4.22	

CIRCLES

CIRCLES ARE A'S in Ale
Barrels, Firkins, Gallons, &c. twelve
Inches.

I.D.	0		B|F|G.P.	$\frac{1}{4}$		B|F|G.P.	$\frac{1}{2}$		B|F|G.P.	$\frac{3}{4}$		B|F|G.P.
	B	F		B	F		B	F		B	F	
41	1	3	0.18	1	3	0.43	1	3	1.56	1	3	2.24
42	1	3	2.84	1	3	3.66	1	3	4.38	1	3	5.08
43	1	3	5.80	1	3	6.52	1	3	7.24	1	3	7.96
44	2	0	0.70	2	0	1.44	2	0	2.18	2	0	2.92
45	2	0	3.66	2	0	4.42	2	0	5.20	2	0	5.96
46	2	0	6.74	2	0	7.50	2	1	0.28	2	1	1.04
47	2	1	1.82	2	1	2.60	2	1	3.40	2	1	4.20
48	2	1	5.00	2	1	5.80	2	1	6.61	2	1	7.42
49	2	2	0.24	2	2	1.06	2	2	1.88	2	2	2.70
50	2	2	3.54	2	2	4.38	2	2	5.22	2	2	6.06
51	2	2	6.92	2	2	7.78	2	3	0.64	2	3	1.50
52	2	3	2.38	2	3	3.24	2	3	4.12	2	3	4.98
53	2	3	5.86	2	3	6.76	2	3	7.66	3	0	0.56
54	3	0	1.46	3	0	2.36	3	0	3.28	3	0	4.18
55	3	0	5.10	3	0	6.02	3	0	7.22	3	1	0.06
56	3	1	0.80	3	1	1.74	3	1	2.68	3	1	3.62
57	3	1	4.58	3	1	5.54	3	1	6.50	3	1	7.46
58	3	2	0.42	3	2	1.40	3	2	2.38	3	2	3.36
59	3	2	4.34	3	2	5.32	3	2	6.32	3	2	7.30
60	3	3	0.30	3	3	1.32	3	3	2.34	3	3	3.36

CIRCLES AREA'S in Beer
Barrels, Firkins, Gallons, &c. twelve
Inches.

I.D.	0.			$\frac{1}{2}$			$\frac{2}{1}$			$\frac{4}{3}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
61	3	1	7.36	3	1	8.38	3	2	0.42	3	2	1.44
62	3	2	2.48	3	2	3.52	3	2	4.56	3	2	5.60
63	3	2	6.64	3	2	7.70	3	2	8.76	3	3	0.82
64	3	3	1.90	3	3	2.96	3	2	4.04	3	2	5.12
65	3	3	6.20	3	3	7.28	3	2	8.38	4	0	0.48
66	4	0	1.58	4	0	2.68	4	0	3.80	4	0	4.90
67	4	0	6.02	4	0	7.14	4	0	8.26	4	1	0.38
68	4	1	1.52	4	1	2.66	4	1	3.82	4	1	4.96
69	4	1	6.12	4	1	7.28	4	1	8.44	4	2	0.60
70	4	2	1.76	4	2	2.94	4	2	4.12	4	2	5.30
71	4	2	6.48	4	2	7.66	4	2	8.86	4	3	1.04
72	4	3	2.24	4	3	3.44	4	3	4.66	4	3	5.88
73	4	3	7.10	4	3	8.32	5	0	0.56	5	0	1.78
74	5	0	3.02	5	0	4.26	5	0	5.50	5	0	6.74
75	5	0	8.00	5	1	0.26	5	1	1.52	5	1	2.78
76	5	1	4.04	5	1	5.30	5	1	6.58	5	1	7.86
77	5	2	0.14	5	2	1.42	5	2	2.72	5	2	4.02
78	5	2	5.32	5	2	6.62	5	2	7.94	5	3	0.26
79	5	3	1.58	5	3	2.99	5	3	4.22	5	3	5.54
80	5	3	6.88	5	3	8.22	6	0	0.56	6	0	1.90

CIRCLES

CIRCLES AREAS in Ale
Barrels, Firkins, Gallons, &c. twelve
Inches.

I.D.	0		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B	F|G.P.	B	F|G.P.	B	F|G.P.	B	F|G.P.
61	33	4.36	3	3|5.38	33	6.42	33	7.44
62	40	0.48	4	0|1.52	40	2.56	40	2.60
63	40	4.64	4	0|5.70	40	6.76	40	7.82
64	41	0.90	4	1|1.96	41	3.04	41	4.12
65	41	5.20	4	1|6.28	41	7.38	41	0.48
66	42	1.58	4	2|2.68	42	3.80	42	4.90
67	42	6.02	4	2|7.14	43	0.26	43	1.38
68	43	2.52	4	3|3.66	43	4.82	43	5.96
69	43	7.12	5	0|0.28	50	1.44	50	2.60
70	50	3.76	5	0|4.94	50	6.12	50	7.30
71	51	0.48	5	1|1.66	51	2.86	51	4.04
72	51	5.24	5	1|6.44	51	7.66	52	0.88
73	52	2.10	5	2|3.32	52	4.56	52	5.78
74	52	7.02	5	3|0.26	53	1.50	53	2.74
75	53	4.00	5	3|5.26	53	6.52	53	7.78
76	60	1.04	6	0|2.30	60	3.58	60	4.80
77	60	6.14	6	0|7.42	61	0.72	61	2.02
78	61	3.32	6	1|4.62	61	5.94	61	7.26
79	62	0.58	6	2|1.90	62	3.22	62	4.54
80	62	5.88	6	2|7.22	63	0.56	63	1.00

CIRCLES AREA'S in Beer Barrels, Firkins, Gallons, &c. twelve Inches.

I.D.	0		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B	F|G.P.	B	F|G.P.	B	F|G.P.	B	F|G.P.
81	6	0 3.26	6	0 4.62	6	0 5.98	6	0 7.34
82	6	0 8.72	6	1 1.08	6	1 2.46	6	1 3.84
83	6	1 5.22	6	1 6.62	6	1 8.02	6	2 0.42
84	6	1 1.82	6	2 3.22	6	2 4.64	6	2 6.04
85	6	2 7.46	6	2 8.88	6	3 1.32	6	3 2.74
86	6	3 4.18	6	3 5.62	6	3 7.06	6	3 8.50
87	7	0 0.96	7	0 2.42	7	0 3.88	7	0 5.34
88	7	0 6.80	7	0 8.28	7	1 0.76	7	1 2.24
89	7	1 3.72	7	1 5.20	7	1 6.70	7	1 8.20
90	7	2 0.70	7	2 2.20	7	2 3.72	7	2 5.24
91	7	2 6.76	7	2 8.28	7	3 0.80	7	3 2.32
92	7	3 3.86	7	3 5.40	7	3 6.96	7	3 8.50
93	8	0 1.06	8	0 2.62	8	0 4.18	8	0 5.74
94	8	0 7.30	8	0 8.88	8	1 1.46	8	1 3.04
95	8	1 4.62	8	1 6.20	8	1 7.80	8	2 0.40
96	8	2 1.92	8	2 3.60	8	2 5.22	8	2 6.84
97	8	2 8.46	8	3 1.08	8	3 2.70	8	3 4.32
98	8	3 5.96	8	3 7.60	9	0 9.26	9	0 1.90
99	9	0 3.56	9	0 5.22	9	0 6.88	9	0 8.54
100	9	1 1.22	9	1 2.88	9	1 4.56	9	1 6.24

CIRCLES

CIRCLES ARE A'S in Ale
Barrels, Firkins, Gallons, &c. twelve
Inches.

I.D.	0			$\frac{1}{2}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G. P.	B	F	G. P.	B	F	G. P.	B	F	G. P.
81	63	3.26		63	4.62		63	5.98		63	7.34	
82	70	0.72		70	2.08		70	3.46		70	4.84	
83	70	6.22		70	7.62		71	1.02		71	2.42	
84	71	3.82		71	5.22		71	6.64		72	0.04	
85	72	1.46		72	2.88		72	4.32		72	5.74	
86	72	7.18		73	0.62		73	2.06		73	3.50	
87	73	4.96		73	6.42		73	7.88		80	1.34	
88	80	2.80		80	4.28		80	5.76		80	7.24	
89	81	0.72		81	2.20		81	3.70		81	5.20	
90	81	6.70		82	0.20		82	1.72		82	3.24	
91	82	4.76		82	6.28		82	7.80		83	1.32	
92	83	2.86		83	4.40		83	5.96		83	7.50	
93	90	1.06		90	2.62		90	4.18		90	5.74	
94	90	7.30		91	0.88		91	2.46		91	4.04	
95	91	5.62		91	7.20		92	0.80		92	2.40	
96	92	3.92		92	5.60		92	7.22		93	0.84	
97	93	2.46		93	4.08		93	5.70		93	7.32	
98	100	0.96		100	2.60		100	4.26		100	5.90	
99	100	7.56		101	1.22		101	2.88		101	4.54	
100	101	6.22		101	7.88		102	1.56		102	3.24	

CIRCLES AREAS in Beer Barrels, Firkins, Gallons, &c. twelve Inches.

I.D.	0			$\frac{1}{2}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G. P.	B	F	G. P.	B	F	G. P.	B	F	G. P.
101	9	1	7.92	9	2	0.60	9		2.30	9	2	4.00
102	9	2	5.70	9	2	7.40	9	3	0.12	9	3	1.84
103	9	3	3.56	9	3	5.28	9	3	7.02	9	3	8.76
104	10	0	1.48	10	0	3.02	10	0	4.78	10	0	6.52
105	10	0	8.48	10	1	1.24	10	1	3.00	10	1	4.76
106	10	1	6.52	10	1	8.30	10	2	1.08	10	2	2.86
107	10	2	4.64	10	2	6.42	10	2	8.22	10	3	1.02
108	10	3	2.82	10	3	4.62	10	3	6.44	10	3	8.26
109	11	0	1.08	11	0	2.90	11	0	4.74	11	0	6.56
110	11	0	8.40	11	1	1.24	11	1	3.08	11	1	4.92
111	11	1	6.78	11	1	8.64	11	2	.50	11	2	3.36
112	11	2	5.24	11	2	7.12	11	3	0.40	11	3	1.88
113	11	3	3.76	11	3	5.64	11	3	3.54	12	0	0.44
114	12	0	2.34	12	0	4.24	12	0	6.16	12	0	8.08
115	12	1	1.00	12	1	2.92	12	1	4.86	12	1	6.80
116	12	1	8.72	12	2	1.66	12	2	3.60	12	2	5.54
117	12	2	7.50	12	3	0.56	12	3	2.42	12	3	4.38
118	12	3	6.36	12	3	8.34	13	0	1.32	13	0	3.30
119	13	0	5.28	13	0	7.26	13	1	0.26	13	1	2.26
120	13	1	4.26	13	1	6.26	13	1	8.28	13	2	1.30

CIRCLES

CIRCLES ARE A'S in Ale
Barrels, Firkins, Gallons, &c. twelve
Inches.

I.D.	0			$\frac{1}{2}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G. P.	B	F	G. P.	B	F	G. P.	B	F	G. P.
101	10	2	4.92	10	2	6.60	10	3	0.30	10	3	2.00
102	10	3	3.70	10	3	5.40	10	3	7.12	11	0	0.84
103	11	0	2.56	11	0	4.28	11	0	6.02	11	0	7.76
104	11	1	1.48	11	1	3.02	11	1	4.78	11	1	6.52
105	11	2	0.48	11	2	2.24	11	2	4.00	11	2	5.76
106	11	2	7.52	11	3	1.30	11	3	3.08	11	3	4.86
107	11	3	6.64	12	0	0.42	12	0	2.22	12	0	4.02
108	12	0	5.82	12	0	7.62	12	1	1.44	12	1	3.26
109	12	1	5.08	12	1	6.90	12	2	0.74	12	2	2.56
110	12	2	4.40	12	2	6.24	12	3	0.08	12	3	1.92
111	12	3	3.78	12	3	5.64	12	3	7.50	13	0	1.36
112	13	0	3.24	13	0	5.12	13	0	7.40	13	1	0.88
113	13	1	2.76	13	1	4.64	13	1	6.54	13	2	0.44
114	13	2	2.34	13	2	4.24	13	2	6.16	13	3	0.08
115	13	3	2.00	13	3	3.92	13	3	5.86	13	3	7.80
116	14	0	1.72	14	0	3.66	14	0	5.60	14	0	7.54
117	14	1	1.50	14	1	3.56	14	1	5.42	14	1	7.38
118	14	2	1.36	14	2	3.34	14	2	5.32	14	2	7.30
119	14	3	1.28	14	3	3.26	14	3	5.26	14	3	7.26
120	15	0	1.26	15	0	3.26	15	0	5.28	15	0	7.30

CIRCLES ARE A'S in Beer
Barrels, Firkins, Gallons, &c. twelve
Inches.

I.D.	0		$\frac{1}{2}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B|F	G.P.	B|F	G.P.	B|F	G.P.	B|F	G.P.
121	13|2	3.32	13|2	5.34	13|2	7.38	13|3	0.40
122	13|3	2.44	13|3	4.46	13|3	6.52	13|3	8.56
123	14|0	1.62	14|0	3.68	14|0	5.74	14|0	7.80
124	14|1	0.88	14|1	2.96	14|1	5.04	14|1	7.12
125	14|2	0.20	14|2	2.28	14|2	4.38	14|2	6.48
126	14|2	8.58	14|3	1.68	14|3	3.80	14|3	5.92
127	14|3	8.04	15|0	1.16	15|0	3.30	15|0	5.44
128	15|0	7.58	15|1	0.72	15|1	2.86	15|1	5.00
129	15|1	7.16	15|2	0.32	15|2	2.48	15|2	4.64
130	15|2	6.80	15|2	8.98	15|3	2.16	15|3	4.34
131	15|3	6.52	15|3	8.72	16|0	1.92	16|0	4.12
132	16|0	6.32	16|0	8.52	16|1	1.74	16|1	3.96
133	16|1	6.18	16|1	8.40	16|2	1.64	16|2	3.86
134	16|2	6.10	16|2	8.34	16|3	1.58	16|3	3.82
135	16|3	6.10	16|3	8.36	17|0	1.62	17|0	3.88
136	17|0	6.16	17|0	8.44	17|1	1.72	17|1	4.00
137	17|1	6.28	17|1	8.58	17|2	1.88	17|2	4.18
138	17|2	6.48	17|2	8.78	17|3	2.10	17|3	4.42
139	17|3	6.74	18|0	0.06	18|0	2.40	18|0	4.72
140	18|0	7.16	18|1	0.40	18|1	2.74	18|1	5.08

CIRCLES

CIRCLES ARE A'S in Ale
Barrels, Firkins, Gallons, &c. twelve
Inches.

I.D.	0			$\frac{1}{2}$			$\frac{1}{3}$			$\frac{1}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
121	15	1	1.32	15	1	3.34	15	1	5.38	15	1	7.40
122	15	2	1.44	15	2	3.48	15	2	5.52	15	2	7.56
123	15	3	1.62	15	3	3.68	15	3	5.74	15	3	7.80
124	16	0	1.88	16	0	3.96	16	0	6.04	16	0	8.12
125	16	1	2.20	16	1	4.28	16	1	6.38	16	2	8.48
126	16	2	2.58	16	2	4.68	16	2	6.80	16	3	8.92
127	16	3	3.04	16	3	5.16	16	3	7.30	17	0	1.44
128	17	0	3.58	17	0	5.72	17	0	7.86	17	1	2.00
129	17	1	4.16	17	1	6.32	17	2	8.48	17	2	2.64
130	17	2	4.80	17	2	6.98	17	3	1.16	17	3	3.34
131	17	3	5.52	17	3	7.72	18	0	1.92	18	0	4.12
132	18	0	6.32	18	1	8.52	18	1	2.74	18	1	4.96
133	18	1	7.18	18	2	1.40	18	2	7.64	18	2	5.86
134	18	3	8.10	18	3	2.34	18	3	8.58	18	3	7.82
135	19	0	1.10	19	0	3.36	19	0	5.62	19	0	7.88
136	19	0	1.16	19	1	4.44	19	1	6.72	19	2	8.00
137	19	2	3.28	19	2	5.58	19	2	7.88	19	3	2.18
138	19	3	4.48	19	3	6.78	20	0	1.10	20	0	3.42
139	20	0	5.74	20	1	8.06	20	1	2.40	20	1	4.72
140	20	1	7.16	20	2	1.40	20	2	3.74	20	2	6.08

CIRCLES

CIRCLES AREA'S in Beer
Barrels, Firkins, Gallons, &c. twelve
Inches.

I.D.	0		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B|F	G.P.	B|F	G.P.	B|F	G.P.	B|F	G.P.
141	18|1	7.44	18|2	0.80	18|2	3.16	18|2	5.52
142	18|2	7.90	18|3	1.28	18|3	3.66	18|3	6.04
143	18|3	8.42	19|0	1.82	19|0	4.22	19|0	6.62
144	19|0	0.02	19|1	2.42	19|1	4.84	19|1	7.26
145	19|2	0.68	19|2	3.10	19|2	5.54	19|2	7.96
146	19|3	1.40	19|3	3.84	19|3	6.30	19|3	8.74
147	20|0	2.20	20|0	4.66	20|0	7.12	20|1	0.58
148	20|1	3.06	20|1	4.54	20|1	8.02	20|2	1.50
149	20|2	3.98	20|2	5.48	20|2	8.98	20|3	2.48
150	20|3	4.98	20|3	7.48	21|0	1.00	21|0	3.52
151	21|0	9.04	21|0	8.56	21|1	2.10	21|1	4.62
152	21|1	7.16	21|2	0.70	21|2	3.24	21|2	5.79
153	21|2	8.34	21|3	1.90	21|3	4.46	21|3	7.04
154	22|0	0.62	22|0	3.20	22|0	5.78	22|0	8.36
155	22|1	1.94	22|1	4.52	22|1	7.12	22|2	0.72
156	22|2	3.32	22|2	5.92	22|2	8.54	22|3	2.16
157	22|3	4.78	22|3	7.40	23|0	1.04	23|0	3.68
158	23|0	6.32	23|0	8.96	23|1	2.62	23|1	5.28
159	23|1	7.92	23|2	1.58	23|2	4.24	23|2	6.90
160	23|3	0.58	23|3	3.26	23|3	5.94	23|3	8.62

CIRCLES

CIRCLES AREAS in Ale
Barrels, Firkins, Gallons, &c. twelve
Inches.

I.D.	0			$\frac{1}{2}$			$\frac{3}{4}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
141	20	3	0.44	20	3	2.80	20	3	5.16	20	3	7.52
142	21	0	1.90	21	0	4.28	21	0	6.66	21	1	1.04
143	21	1	3.42	21	1	5.82	21	2	0.22	21	2	2.62
144	21	2	5.02	21	2	7.42	21	3	1.84	21	3	4.26
145	21	3	6.68	22	0	1.10	22	0	3.54	22	0	5.96
146	22	1	0.40	22	1	2.84	22	1	5.30	22	1	7.74
147	22	2	2.20	22	2	4.66	22	2	7.12	22	3	1.58
148	22	3	4.06	22	3	6.54	23	0	1.02	23	0	3.50
149	23	0	5.98	23	1	0.48	23	1	2.98	23	1	5.48
150	23	1	7.98	23	2	2.48	23	2	5.00	23	2	7.52
151	23	3	2.04	23	3	4.56	23	3	7.10	24	0	1.62
152	24	0	4.16	24	0	6.70	24	1	1.24	24	1	3.79
153	24	1	6.34	24	2	0.90	24	2	3.46	24	2	6.04
154	24	3	0.62	24	3	3.20	24	3	5.78	25	0	0.36
155	25	0	2.94	25	0	5.52	25	1	0.12	25	1	2.72
156	25	1	5.32	25	1	7.92	25	2	2.54	25	2	5.16
157	25	2	7.78	25	3	2.40	25	3	5.04	25	3	7.68
158	26	0	2.32	26	0	4.96	26	0	7.62	26	1	2.28
159	26	1	4.92	26	1	7.58	26	2	2.24	26	2	4.90
160	26	2	7.58	26	3	2.26	26	3	4.94	26	3	7.62

CIRCLES

CIRCLES AREA'S in Beer
Barrels, Firkins, Gallons, &c. twelve
Inches.

I.D.	6			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
161	24	0	2.30	24	0	5.00	24	0	7.70	24	1	1.40
162	24	1	4.10	24	1	6.82	24	2	0.54	24	2	3.26
163	24	2	5.98	24	2	8.70	24	3	2.42	24	3	5.14
164	24	3	7.88	25	0	1.62	25	0	4.38	24	0	7.12
165	25	1	0.88	25	1	3.64	25	1	6.40	25	2	0.16
166	25	2	2.94	25	2	5.72	25	2	8.50	25	3	2.28
167	25	3	5.08	25	3	7.88	26	0	1.70	26	0	4.52
168	25	3	7.28	26	1	1.10	26	1	3.92	26	1	6.74
169	26	2	0.54	26	2	3.36	26	2	6.20	26	3	0.04
170	26	3	2.88	26	3	5.72	26	3	8.56	27	0	2.40
171	27	0	5.26	27	0	8.12	27	0	1.98	27	1	4.84
172	27	1	7.72	27	1	1.60	27	2	4.44	27	2	7.36
173	27	3	1.26	27	3	4.14	27	3	7.02	28	0	1.12
174	28	0	3.86	28	0	6.76	28	1	0.68	28	1	3.60
175	28	1	6.52	28	2	0.44	28	2	3.38	28	2	6.32
176	28	3	0.26	28	3	3.20	28	3	6.16	29	0	0.12
177	29	0	3.06	29	0	6.02	29	0	8.98	29	1	2.94
178	29	1	5.90	29	1	8.88	29	2	2.86	29	2	5.84
179	29	2	8.84	29	3	2.84	29	3	5.84	29	3	8.84
180	30	0	2.84	30	0	5.84	30	0	8.86	30	1	2.88

CIRCLES

CIRCLES AREA'S in Ale
Barrels, Firkins, Gallons, &c. twelve
Inches.

I.D.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
161	27	0	2.30	27	0	5.00	27	0	7.70	27	1	2.40
162	27	1	5.10	27	1	7.82	27	2	2.54	27	2	5.26
163	27	2	7.98	27	3	2.70	27	3	5.42	28	0	0.14
164	28	0	2.88	28	0	5.62	28	1	0.38	28	1	3.12
165	28	1	5.88	28	2	0.64	28	2	3.40	28	2	6.16
166	28	3	0.94	28	3	3.72	28	3	6.50	29	0	1.28
167	29	0	4.08	29	0	6.88	29	1	1.70	29	1	4.52
168	29	1	7.28	29	2	2.10	29	2	4.92	29	2	7.74
169	29	3	2.54	29	3	5.36	30	0	0.20	30	0	3.04
170	30	0	5.88	30	1	0.72	30	1	3.56	30	1	6.40
171	30	2	1.26	30	2	4.12	30	2	6.98	30	3	1.84
172	30	3	4.72	30	3	7.60	31	0	2.48	31	0	5.36
173	31	1	0.26	31	1	3.14	31	1	6.02	31	2	1.12
174	31	2	3.86	31	2	6.76	31	3	1.86	31	3	4.60
175	31	3	7.52	32	0	2.44	32	0	5.38	32	1	0.32
176	32	1	3.26	32	1	6.20	32	2	1.16	32	2	4.12
177	32	2	7.06	32	3	2.02	32	3	4.98	32	3	7.94
178	33	0	2.90	33	0	5.88	33	1	0.86	33	1	3.84
179	33	1	6.84	33	2	1.84	33	2	4.84	33	2	7.84
180	33	3	2.84	33	3	5.84	34	0	0.86	34	0	3.86

CIRCLES

CIRCLES AREA'S in Beer Barrels, Firkins, Gallons, &c. twelve Inches.

I.D.	0			.1			.2			.3		
	B	F	G. P.	B	F	G. P.	B	F	G. P.	B	F	G. P.
181	30	1	5.90	30	1	8.92	30	2	2.96	30	2	6.00
182	30	3	0.04	30	3	3.08	30	3	6.14	31	0	0.18
183	31	0	3.24	31	0	6.30	31	1	0.36	31	1	3.42
184	31	1	6.50	31	2	0.58	31	2	3.66	31	2	6.74
185	31	3	0.84	31	3	3.94	31	3	7.04	32	0	1.14
186	32	0	4.24	32	0	7.34	32	1	1.46	32	1	4.58
187	32	1	7.70	32	2	1.82	32	2	4.96	32	2	8.10
188	32	3	2.24	32	3	5.38	32	3	8.54	33	0	2.68
189	33	0	5.84	33	1	0.00	33	1	3.16	33	1	6.32
190	33	2	0.50	33	2	3.68	33	2	6.06	33	3	1.04
191	33	3	4.24	33	3	7.44	34	0	1.84	34	0	4.84
192	34	0	8.04	34	1	2.24	34	1	5.46	34	1	8.68
193	34	2	2.90	34	2	6.12	34	3	0.36	34	3	3.60
194	34	3	6.84	35	0	1.08	35	0	4.34	35	0	7.60
195	35	1	1.84	35	1	5.10	35	1	8.36	35	2	2.62
196	35	2	5.90	35	3	0.18	45	3	3.46	35	3	6.74
197	36	0	1.04	36	0	4.34	36	0	7.70	36	1	2.00
198	36	1	5.24	36	1	8.54	36	2	2.86	36	2	6.18
199	36	3	0.00	36	3	3.86	36	3	7.22	37	0	1.56
200	37	0	4.84	37	0	8.18	37	1	2.54	27	1	5.88

CIRCLES

CIRCLES AREA'S in Ale Barrels, Firkins, Gallons, &c. twelve Inches.

I.D.	0		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B|F	G. P.	B|F	G. P.	B|F	G. P.	B|F	G. P.
181	34|0	6.86	34|1	1.92	34|1	4.96	34|2	0.00
182	34|2	3.04	34|2	6.08	34|3	1.14	34|3	4.18
183	34|3	7.24	35|0	2.30	35|0	5.36	35|1	0.42
184	35|1	3.50	35|1	6.58	35|2	1.66	35|2	4.74
185	35|2	7.84	35|3	2.94	35|3	6.04	36|0	1.14
186	36|0	4.24	36|0	7.34	36|1	2.46	36|1	5.58
187	36|2	0.70	36|2	3.82	36|2	6.96	36|3	2.10
188	36|3	5.24	37|0	0.38	37|0	3.54	37|0	6.68
189	37|1	1.84	37|1	5.00	37|2	0.16	37|2	3.32
190	37|2	6.50	37|3	1.68	37|3	4.86	38|0	0.04
191	38|0	3.24	38|0	6.44	38|1	2.04	38|1	4.84
192	38|2	0.04	38|2	3.24	38|2	6.46	38|3	1.68
193	38|3	4.90	39|0	0.12	39|0	3.36	39|0	6.60
194	39|1	1.84	39|1	5.08	39|2	0.34	39|2	3.60
195	39|2	6.84	39|3	2.10	39|3	5.36	40|0	0.62
196	40|0	3.90	40|0	7.18	40|1	2.46	40|1	5.74
197	40|2	1.04	40|2	4.34	40|2	7.70	40|3	3.00
198	40|3	6.24	41|0	1.54	41|0	4.86	41|1	0.18
199	41|1	3.50	41|1	6.86	41|2	2.22	41|2	5.56
200	41|3	0.84	41|3	4.18	41|3	7.54	42|0	2.88

CIRCLES

CIRCLES AREA'S in Beer
Barrels, Firkins, Gallons, &c. twelve
Inches.

	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
I.D.	B	F	G. P.	B	F	G. P.	B	F	G. P.	B	F	G. P.
201	37	2	0.24	37	2	3.60	37	2	6.98	37	3	1.34
202	37	3	4.72	37	3	8.10	38	-	2.48	38	0	5.86
203	38	1	0.26	38	1	3.66	38	-	7.06	38	2	1.46
204	38	2	4.86	38	2	8.28	38	-	2.72	38	3	6.16
205	39	0	0.52	39	0	3.94	39	-	7.38	39	1	1.82
206	39	1	5.26	39	1	8.70	39	2	3.14	39	2	6.60
207	39	3	1.06	39	3	4.52	39	3	7.98	40	0	2.46
208	40	0	5.94	40	1	0.42	40	1	3.90	40	1	7.38
209	40	2	1.86	40	2	5.36	40	2	8.86	40	3	3.36
210	40	3	6.88	41	0	1.38	41	0	4.90	41	0	8.42
211	41	1	2.94	41	1	6.46	41	2	1.00	41	2	4.54
212	41	2	8.08	41	3	2.62	41	3	6.18	42	0	0.72
213	42	0	4.28	42	0	7.84	42	1	2.42	42	1	5.98
214	42	2	0.56	42	-	4.14	42	2	7.72	42	3	2.30
215	42	3	5.90	43	0	0.50	43	-	1.10	43	0	7.70

CIRCLES

CIRCLES AREAS in Ale Barrels, Firkins, Gallons, &c. twelve Inches.

I.D.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G. P.	B	F	G. P.	B	F	G. P.	B	F	G. P.
201	42	0	6.24	42	1	1.60	42	1	4.98	42	2	0.34
202	42	2	3.72	42	2	7.10	42	3	2.48	42	3	5.86
203	43	0	1.26	43	0	4.66	43	1	0.06	43	1	3.46
204	43	1	6.86	43	2	2.28	43	2	5.72	43	3	1.16
205	43	3	4.52	43	3	7.94	44	0	3.38	44	0	6.82
206	44	1	2.26	44	1	5.70	44	2	1.14	44	2	4.60
207	44	3	0.06	44	3	3.52	44	3	6.98	45	0	2.46
208	45	0	5.94	45	1	1.42	45	1	4.91	45	2	0.38
209	45	2	3.86	45	2	7.36	45	3	2.86	45	3	6.36
210	46	0	1.88	46	0	5.38	46	1	0.90	46	1	4.42
211	46	1	7.94	46	2	3.46	46	2	7.00	46	3	2.54
212	46	3	6.08	47	0	1.62	47	0	5.18	47	1	0.72
213	47	1	4.28	47	1	7.84	47	2	3.42	47	2	6.98
214	47	3	2.56	47	3	6.14	48	0	1.72	48	0	5.30
215	48	1	0.90	48	1	4.50	48	2	0.10	48	2	2.28

P

CIRCLES

CIRCLES AREA'S in Beer
Barrels, Firkins, Gallons, &c. six
Inches.

I.D.	0		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B	F G.P.	B	F G.P.	B	F G.P.	B	F G.P.
1	00	0.02	00	0.03	00	0.04	00	0.05
2	00	0.07	00	0.08	00	0.10	00	0.13
3	00	0.15	00	0.18	00	0.21	00	0.24
4	00	0.27	00	0.31	00	0.34	00	0.38
5	00	0.43	00	0.46	00	0.50	00	0.55
6	00	0.61	00	0.65	00	0.71	00	0.76
7	00	0.82	00	0.88	00	0.94	00	1.00
8	00	1.07	00	1.14	00	1.21	00	1.28
9	00	1.35	00	1.43	00	1.51	00	1.59
10	00	1.67	00	1.75	00	1.84	00	1.93
11	00	2.02	00	2.11	00	2.21	00	2.31
12	00	2.41	00	2.51	00	2.61	00	2.71
13	00	2.82	00	2.93	00	3.05	00	3.16
14	00	3.28	00	3.40	00	3.52	00	3.64
15	00	3.76	00	3.89	00	4.02	00	4.15
16	00	4.28	00	4.42	00	4.56	00	4.69
17	00	4.83	00	4.98	00	5.12	00	5.27
18	00	5.41	00	5.56	00	5.72	00	5.87
19	00	6.03	00	6.19	00	6.35	00	6.51
20	00	6.68	00	6.85	00	7.02	00	7.19

CIRCLES

CIRCLES AREA'S in Ale
Barrels, Firkins, Gallons, &c. six
Inches.

I.D.	0		$\frac{1}{2}$		$\frac{3}{4}$		$\frac{1}{2}$	
	B|F	G.P.	B|F	G.P.	B|F	G.P.	B|F	G.P.
1	0	0.02	0	0.03	0	0.04	0	0.05
2	0	1.07	0	0.08	0	0.10	0	0.13
3	0	0.15	0	0.18	0	0.21	0	0.24
4	0	0.27	0	0.31	0	0.34	0	0.38
5	0	0.43	0	0.46	0	0.50	0	0.55
6	0	0.61	0	0.65	0	0.71	0	0.76
7	0	0.82	0	0.88	0	0.94	0	1.00
8	0	1.07	0	1.14	0	1.21	0	1.28
9	0	1.35	0	1.43	0	1.51	0	1.59
10	0	1.67	0	1.75	0	1.84	0	1.93
11	0	2.02	0	2.11	0	2.21	0	2.31
12	0	2.41	0	2.51	0	2.61	0	2.71
13	0	2.82	0	2.93	0	3.05	0	3.16
14	0	3.28	0	3.40	0	3.52	0	3.64
15	0	3.76	0	3.89	0	4.02	0	4.15
16	0	4.28	0	4.42	0	4.56	0	4.69
17	0	4.83	0	4.98	0	5.12	0	5.27
18	0	5.41	0	5.56	0	5.72	0	5.87
19	0	6.03	0	6.19	0	6.35	0	6.51
20	0	6.68	0	6.85	0	7.02	0	7.19

CIRCLES ARE A'S in Beer
Barrels, Firkins, Gallons, &c. six
Inches.

0				$\frac{1}{4}$				$\frac{1}{2}$				$\frac{3}{4}$			
D	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
21	0	0	7.37	0	0	7.56	0	0	7.74	0	0	7.92			
22	0	0	8.11	0	0	8.29	0	0	8.47	0	0	8.65			
03	0	0	8.84	0	1	0.04	0	1	0.24	0	1	0.44			
24	0	1	0.63	0	1	0.83	0	1	1.03	0	1	1.23			
25	0	1	1.44	0	1	1.66	0	1	1.87	0	1	2.09			
26	0	1	2.30	0	1	2.52	0	1	2.74	0	1	2.96			
27	0	1	3.18	0	1	3.41	0	1	3.64	0	1	3.87			
28	0	1	4.10	0	1	4.33	0	1	4.57	0	1	4.81			
29	0	1	5.05	0	1	5.29	0	1	5.54	0	1	5.79			
30	0	1	6.04	0	1	6.29	0	1	6.55	0	1	6.80			
31	0	1	7.06	0	1	7.33	0	1	7.59	0	1	7.85			
32	0	1	8.11	0	1	8.38	0	1	8.65	0	1	8.92			
33	0	2	0.20	0	2	0.48	0	2	0.76	0	2	1.04			
34	0	2	1.32	0	2	1.61	0	2	1.90	0	2	2.19			
35	0	2	2.47	0	2	2.77	0	2	3.07	0	2	3.37			
36	0	2	3.66	0	2	3.96	0	2	4.27	0	2	4.59			
37	0	2	4.88	0	2	5.20	0	2	5.51	0	2	5.83			
38	0	2	6.13	0	2	6.45	0	2	6.77	0	2	7.09			
39	0	2	7.41	0	2	7.75	0	2	8.08	0	2	8.41			
40	0	2	8.71	0	3	0.08	0	3	0.42	0	3	0.76			

CIRCLES

CIRCLES AREAS in Ale Barrels, Firkins, Gallons, &c. six Inches.

0			1			2			3		
I.D.	B|F	G.P.	B|F	G.P.	B|F	G.P.	B|F	G.P.			
21	0 0	7.37	0 0	7.56	0 0	7.74	0 0	7.92			
22	0 1	0.11	0 1	0.29	0 1	0.47	0 1	0.65			
23	0 1	0.84	0 1	1.04	0 1	1.24	0 1	1.43			
24	0 1	1.63	0 1	1.83	0 1	2.03	0 1	2.23			
25	0 1	2.44	0 1	2.66	0 1	2.87	0 1	3.09			
26	0 1	3.30	0 1	3.52	0 1	3.74	0 1	3.96			
27	0 1	4.18	0 1	4.41	0 1	4.64	0 1	4.87			
28	0 1	5.10	0 1	5.33	0 1	5.57	0 1	5.81			
29	0 1	6.05	0 1	6.29	0 1	6.54	0 1	6.79			
30	0 1	7.04	0 1	7.29	0 1	7.55	0 1	7.86			
31	0 2	0.06	0 2	0.33	0 2	0.59	0 2	0.85			
32	0 2	1.11	0 2	1.38	0 2	1.65	0 2	1.92			
33	0 2	2.20	0 2	2.48	0 2	2.76	0 2	3.04			
34	0 2	3.32	0 2	3.61	0 2	3.90	0 2	4.19			
35	0 2	4.47	0 2	4.77	0 2	5.07	0 2	5.37			
36	0 2	5.66	0 2	5.96	0 2	6.27	0 2	6.57			
37	0 2	6.88	0 2	7.20	0 2	7.52	0 2	7.83			
38	0 3	0.13	0 3	0.45	0 3	0.77	0 3	1.09			
39	0 3	1.42	0 3	1.75	0 3	2.08	0 3	2.41			
40	0 3	2.74	0 3	3.08	0 3	3.42	0 3	3.76			

CIRCLES AREA'S in Beer
Barrels, Firkins, Gallons, &c. six
Inches.

I.D.	0		$\frac{1}{2}$		$\frac{3}{4}$		$\frac{1}{4}$	
	B	F|G.P.	B	F|G.P.	B	F|G.P.	B	F|G.P.
41	0	3 1.09	0	3 1.43	0	3 1.78	0	3 2.12
42	0	3 2.47	0	3 2.83	0	3 3.19	0	3 3.54
43	0	3 3.90	0	3 4.26	0	3 4.62	0	3 4.98
44	0	3 5.35	0	3 5.72	0	3 6.09	0	3 6.46
45	0	3 6.83	0	3 7.21	0	3 7.60	0	3 7.98
46	0	3 8.37	0	3 8.75	1	0 0.14	1	0 0.52
47	1	0 0.91	1	0 1.30	1	0 1.70	1	0 2.10
48	1	0 2.50	1	0 2.90	1	0 3.31	1	0 3.71
49	1	0 4.12	1	0 4.53	1	0 4.94	1	0 5.35
50	1	0 5.77	1	0 6.19	1	0 6.61	1	0 7.03
51	1	0 7.46	1	0 7.89	1	0 8.32	1	0 8.75
52	1	1 0.19	1	1 0.62	1	1 1.06	1	1 1.49
53	1	1 1.93	1	1 2.38	1	1 2.83	1	1 3.28
54	1	1 3.73	1	1 4.18	1	1 4.64	1	1 5.09
55	1	1 5.55	1	1 6.01	1	1 6.61	1	1 7.03
56	1	1 7.40	1	1 7.87	1	1 8.34	1	1 8.81
57	1	2 0.29	1	2 0.77	1	2 1.25	1	2 1.73
58	1	2 2.21	1	2 2.70	1	2 3.19	1	2 3.68
59	1	2 4.17	1	2 4.66	1	2 5.16	1	2 5.65
60	1	2 6.15	1	2 6.66	1	2 7.17	1	2 7.68

CIRCLES

CIRCLES AREAS in Ale Barrels, Firkins, Gallons, &c. six Inches.

LD.	0.			$\frac{1}{2}$			$\frac{3}{4}$			$\frac{4}{5}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
41	0	3	0.09	0	2	4.43	0	3	4.78	0	3	5.12
42	0	3	5.47	0	3	5.83	0	3	6.19	0	3	6.54
43	0	3	6.90	0	3	7.26	0	3	7.62	0	3	7.98
44	1	0	0.35	1	0	0.72	1	0	1.09	1	0	1.46
45	1	0	1.83	1	0	2.21	1	0	2.60	1	0	2.98
46	1	0	3.37	1	0	3.75	1	0	4.14	1	0	4.52
47	1	0	4.91	1	0	5.30	1	0	5.70	1	0	6.10
48	1	0	6.50	1	0	6.90	1	0	7.31	1	0	7.71
49	1	1	0.12	1	1	0.43	1	1	0.94	1	1	1.35
50	1	1	1.77	1	1	2.19	1	1	2.61	1	1	3.03
51	1	1	3.46	1	1	3.89	1	1	4.32	1	1	4.75
52	1	1	5.19	1	1	5.62	1	1	6.06	1	1	6.49
53	1	1	6.93	1	1	7.38	1	1	7.83	1	2	0.28
54	1	2	0.73	1	2	1.18	1	2	1.64	1	2	2.09
55	1	2	2.59	1	2	3.01	1	2	3.47	1	2	3.93
56	1	2	4.40	1	2	4.87	1	2	5.34	1	2	5.81
57	1	2	6.29	1	2	6.77	1	2	7.15	1	2	7.73
58	1	3	0.21	1	3	0.70	1	3	1.19	1	3	1.68
59	1	3	2.17	1	3	2.66	1	3	3.16	1	3	3.65
60	1	3	4.15	1	3	4.66	1	3	5.17	1	3	5.68

CIRCLES AREAS in Beer
Barrels, Firkins, Gallons, &c. six
Inches.

I.D.	0			$\frac{1}{2}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
61	1	2	8.18	1	2	8.69	1	3	0.21	1	3	0.72
62	1	3	1.24	1	3	1.76	1	3	2.28	1	3	2.80
63	1	3	3.32	1	3	3.85	1	3	4.38	1	3	4.91
64	1	3	5.45	1	3	5.98	1	3	6.52	1	3	7.06
65	1	3	7.60	1	3	8.14	1	3	8.69	2	0	0.24
66	2	0	0.79	2	0	1.34	2	0	1.90	2	0	2.45
67	2	0	3.01	2	0	3.57	2	0	4.13	2	0	4.69
68	2	0	5.26	2	0	5.83	2	0	6.41	2	0	6.98
69	2	0	7.56	2	0	8.14	2	0	8.72	2	1	0.30
70	2	1	0.88	2	1	1.47	2	1	2.06	2	1	2.65
71	2	1	3.24	2	1	3.83	2	1	4.43	2	1	5.02
72	2	1	5.62	2	1	6.22	2	1	6.83	2	1	7.44
73	2	1	8.05	2	1	8.66	2	2	0.28	2	2	0.89
74	2	2	1.51	2	2	2.13	2	2	2.75	2	2	3.37
75	2	2	4.00	2	2	4.63	2	2	5.26	2	2	5.89
76	2	2	6.52	2	2	7.15	2	2	7.79	2	2	8.43
77	2	3	0.07	2	3	0.71	2	3	1.36	2	3	2.01
78	2	3	2.66	2	3	3.31	2	3	3.97	2	3	4.63
79	2	3	5.29	2	3	5.95	2	3	6.61	2	3	7.27
80	2	3	7.94	2	3	8.61	3	0	0.28	3	0	0.95

CIRCLES ARE AS in Ale
Barrels, Firkins, Gallons; &c. six
Inches.

I.D.	0		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B|F	G.P.	B|F	G.P.	B|F	G.P.	B|F	G.P.
61	1 3	6.18	1 3	6.69	1 3	7.21	1 3	7.72
62	2 0	0.24	2 0	0.76	2 0	1.28	2 0	1.80
63	2 0	2.32	2 0	2.85	2 0	3.38	2 0	3.91
64	2 0	4.45	2 0	4.98	2 0	5.52	2 0	6.06
65	2 0	6.60	2 0	7.14	2 0	7.69	2 1	0.24
66	2 1	0.79	2 1	1.34	2 1	1.90	2 1	2.45
67	2 1	3.01	2 1	3.57	2 1	4.13	2 1	4.69
68	2 1	5.26	2 1	5.83	2 1	6.41	2 1	6.98
69	2 1	7.56	2 2	0.14	2 2	0.72	2 2	1.30
70	2 2	1.88	2 2	2.47	2 2	3.06	2 2	3.65
71	2 2	4.24	2 2	4.83	2 2	5.43	2 2	6.02
72	2 2	6.62	2 2	7.22	2 2	7.83	2 3	0.44
73	2 3	1.05	2 3	1.66	2 3	2.28	2 3	2.89
74	2 3	3.51	2 3	4.13	2 3	4.75	2 3	5.37
75	2 3	6.00	2 3	6.63	2 3	7.26	2 3	7.89
76	3 0	0.52	3 0	1.15	3 0	1.79	3 0	2.43
77	3 0	3.07	3 0	3.71	3 0	4.36	3 0	5.01
78	3 0	5.66	3 0	6.31	3 0	6.97	3 0	7.63
79	3 1	0.29	3 1	0.95	3 1	1.61	3 1	2.27
80	3 1	2.94	3 1	3.61	3 1	4.28	3 1	4.95

CIRCLES

CIRCLES AREA'S in Beer Barrels, Firkins, Gallons, &c. six Inches.

LD	0			.4			.6			.8		
	B	F	G. P.	B	F	G. P.	B	F	G. P.	B	F	G. P.
81	3	0	1.63	3	0	2.31	3	0	2.99	3	0	3.67
82	3	0	4.36	3	0	5.04	3	0	5.73	3	0	6.41
83	3	0	7.11	3	0	7.81	3	0	8.51	3	1	0.21
84	3	1	0.91	3	1	1.61	3	1	2.32	3	1	3.02
85	3	1	3.73	3	1	4.44	3	1	5.16	3	1	5.87
86	3	1	6.59	3	1	7.31	3	1	8.03	3	1	8.75
87	3	2	0.48	3	2	1.21	3	2	1.94	3	2	2.67
88	3	2	3.40	3	2	4.14	3	2	4.88	3	2	5.62
89	3	2	6.36	3	2	7.10	3	2	7.85	3	2	8.60
90	3	3	0.35	3	3	1.10	3	3	1.86	3	3	2.62
91	3	3	3.38	3	3	4.14	3	3	4.90	3	3	5.66
92	3	3	6.43	3	3	7.20	3	3	7.98	3	3	8.75
93	4	0	0.53	4	0	1.31	4	0	2.09	4	0	2.87
94	4	0	3.65	4	0	4.44	4	0	5.23	4	0	6.02
95	4	0	6.81	4	0	7.60	4	0	8.40	4	1	0.20
96	4	1	1.46	4	1	1.80	4	1	2.61	4	1	3.42
97	4	1	4.23	4	1	5.04	4	1	5.85	4	1	6.66
98	4	1	7.48	4	1	8.30	4	2	0.13	4	2	0.95
99	4	2	1.78	4	2	2.61	4	2	3.44	4	2	4.27
100	4	2	5.11	4	2	5.94	4	2	6.78	4	2	7.61

CIRCLES

CIRCLES AREAS in Ale Barrels, Firkins, Gallons, &c. six Inches.

LD.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
81	3	1	5.63	3	1	6.31	3	1	6.99	3	1	7.67
82	3	2	0.36	3	2	1.04	3	2	1.73	3	2	2.42
83	3	2	3.11	3	2	3.81	3	2	4.51	3	2	5.21
84	3	2	5.91	3	2	6.61	3	2	7.32	3	3	0.02
85	3	3	0.73	3	3	1.44	3	3	2.16	3	3	2.87
86	3	3	3.59	3	3	4.31	3	3	5.03	3	3	5.75
87	3	3	6.48	3	3	7.21	3	3	7.94	4	0	0.67
88	4	0	1.40	4	0	2.14	4	0	2.88	4	0	3.62
89	4	0	4.36	4	0	5.10	4	0	5.85	4	0	6.60
90	4	0	7.35	4	1	0.10	4	1	0.86	4	1	1.62
91	4	1	2.38	4	1	3.14	4	1	3.90	4	1	4.66
92	4	1	5.43	4	1	6.20	4	1	6.98	4	1	7.75
93	4	2	0.53	4	2	1.31	4	2	2.09	4	2	2.87
94	4	2	3.65	4	2	4.44	4	2	5.23	4	2	6.02
95	4	2	6.81	4	2	7.60	4	3	0.40	4	3	1.20
96	4	3	2.00	4	3	2.80	4	3	3.61	4	3	4.42
97	4	3	5.23	4	3	6.04	4	3	6.85	4	3	7.66
98	5	0	0.48	5	0	1.30	5	0	2.13	5	0	2.95
99	5	0	3.78	5	0	4.61	5	0	5.44	5	0	6.27
100	5	0	7.11	5	0	7.94	5	1	0.78	5	1	1.62

CIRCLES

CIRCLES AREAS in Beer Barrels, Firkins, Gallons, &c. six Inches.

I.D.	0		$\frac{1}{2}$		$\frac{3}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B	F|G.P.	B	F|G.P.	B	F|G.P.	B	F|G.P.	B	F|G.P.
101	4	2 8.46	4	3 0.30	4	3 1.15	4	3 2.00		
102	4	3 2.85	4	3 3.70	4	3 4.56	4	3 5.42		
103	4	3 6.28	4	3 7.14	4	3 8.01	4	3 8.88		
104	5	0 0.74	5	0 1.51	5	0 2.39	5	0 3.26		
105	5	0 4.24	5	0 5.12	5	0 6.00	5	0 6.88		
106	5	0 7.76	5	0 8.65	5	1 0.54	5	1 1.43		
107	5	1 2.32	5	1 3.21	5	1 4.11	5	1 5.01		
108	5	1 5.91	5	1 6.81	5	1 7.72	5	1 8.63		
109	5	2 0.54	5	2 1.45	5	2 2.37	5	2 3.28		
110	5	2 4.20	5	2 5.12	5	2 6.04	5	2 6.96		
111	5	2 7.89	5	2 8.82	5	3 0.75	5	3 1.68		
112	5	3 2.62	5	3 3.56	5	3 4.50	5	3 5.44		
113	5	3 6.38	5	3 7.32	5	3 8.27	6	0 0.22		
114	6	0 1.17	6	0 2.12	6	0 3.08	6	0 4.04		
115	6	0 5.00	6	0 5.96	6	0 6.93	6	0 7.90		
116	6	0 8.86	6	1 0.83	6	1 1.80	6	1 2.77		
117	6	1 3.75	6	1 4.73	6	1 5.71	6	1 6.69		
118	6	1 7.68	6	1 8.67	6	2 0.66	6	2 1.65		
119	6	2 2.64	6	2 3.63	6	2 4.63	6	2 5.63		
120	6	2 6.63	6	2 7.63	6	2 8.64	6	3 0.65		

CIRCLES

CIRCLES AREA'S in Ale
Barrels, Firkins, Gallons, &c. six
Inches.

I.D	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
101	5	1	2.46	5	1	3.30	5	1	4.15	5	1	5.00
102	5	1	5.85	5	1	6.70	5	1	7.56	5	2	0.42
103	5	2	1.28	5	2	2.14	5	2	3.01	5	2	3.88
104	5	2	4.74	5	2	5.51	5	2	6.39	5	2	7.26
105	5	3	0.24	5	3	1.12	5	3	2.00	5	3	2.88
106	5	3	3.76	5	3	4.65	5	3	5.54	5	3	6.43
107	5	3	7.32	6	0	0.21	6	0	1.11	6	0	2.01
108	6	0	2.91	6	0	3.81	6	0	4.72	6	0	5.63
109	6	0	6.42	6	0	7.45	6	1	0.37	6	1	1.28
110	6	1	2.20	6	1	3.12	6	1	4.04	6	1	4.96
111	6	1	5.89	6	1	6.82	6	1	7.75	6	2	0.68
112	6	2	1.62	6	2	2.56	6	2	3.50	6	2	4.44
113	6	2	5.36	6	2	6.32	6	2	7.27	6	3	0.22
114	6	3	1.17	6	3	2.12	6	3	3.08	6	3	4.04
115	6	3	5.00	6	3	5.96	6	3	6.93	6	3	7.90
116	7	0	0.86	7	0	1.83	7	0	2.80	7	0	3.27
117	7	0	4.75	7	0	5.73	7	0	6.71	7	0	7.69
118	7	1	0.68	7	1	1.67	7	1	2.66	7	1	3.65
119	7	1	4.64	7	1	5.63	7	1	6.63	7	1	7.63
120	7	2	0.63	7	2	1.63	7	2	2.64	7	2	3.65

CIRCLES

CIRCLES AREAS in Beer
Barrels, Firkins, Gallons, &c. six
Inches.

0			$\frac{1}{2}$			$\frac{3}{4}$			$\frac{1}{4}$			
I.D.	B.F.	G.P.	B.F.	G.P.	B.F.	G.P.	B.F.	G.P.	B.F.	G.P.		
121	6	3	1.66	6	3	2.67	6	3	3.69	6	3	4.70
122	6	3	5.72	6	3	6.74	6	3	7.76	6	3	8.78
123	7	0	0.81	7	0	1.84	7	0	2.87	7	0	3.90
124	7	0	4.94	7	0	5.98	7	0	7.02	7	0	8.06
125	7	1	0.10	7	1	1.14	7	1	2.19	7	1	3.24
126	7	1	4.29	7	1	5.34	7	1	6.40	7	1	7.46
127	7	1	8.52	7	2	0.58	7	2	1.65	7	2	2.72
128	7	2	3.79	7	2	4.86	7	2	5.93	7	2	7.00
129	7	2	8.08	7	3	0.16	7	3	1.24	7	3	2.32
130	7	3	3.40	7	3	4.49	7	3	5.58	7	3	6.67
131	7	3	7.76	7	3	8.86	8	0	0.96	8	0	2.69
132	8	0	3.16	8	0	4.26	8	0	5.37	8	0	6.48
133	8	0	7.59	8	0	8.70	8	1	0.82	8	1	1.93
134	8	1	3.05	8	1	4.17	8	1	5.29	8	1	6.42
135	8	1	7.55	8	1	8.68	8	2	0.81	8	2	1.94
136	8	2	3.08	8	2	4.22	8	2	5.36	8	2	6.50
137	8	2	7.64	8	2	8.74	8	3	0.94	8	3	2.09
138	8	3	3.24	8	3	4.39	8	3	5.55	8	3	6.71
139	8	3	7.87	9	0	0.03	9	0	1.20	9	0	2.36
140	9	0	3.53	9	0	4.70	9	0	5.87	9	0	7.04

CIRCLES

CIRCLES AREA'S in Ale Barrels, Firkins, Gallons, &c. fix Inches.

I.D.	0			$\frac{1}{2}$			$\frac{1}{2}$			$\frac{1}{2}$		
	B	F	G. P.	B	F	G. P.	B	F	G. P.	B	F	G. P.
121	72		4.66	72		5.67	72		6.69	72		7.70
122	73		0.72	73		1.74	73		2.76	73		3.78
123	73		4.81	73		5.84	73		6.87	73		7.90
124	80		0.94	80		1.98	80		3.02	80		4.06
125	80		5.10	80		6.14	80		7.19	81		0.24
126	81		1.29	81		2.34	81		3.40	81		4.46
127	81		5.52	81		6.58	81		7.65	82		0.72
128	82		1.79	82		2.86	82		3.93	82		5.00
129	82		6.08	82		7.16	83		0.24	83		1.32
130	83		2.40	83		3.49	83		4.58	83		5.67
131	83		6.76	83		7.86	90		0.96	90		2.06
132	90		3.16	90		4.26	90		5.37	90		6.48
133	90		7.59	91		0.70	91		1.82	91		2.93
134	91		4.05	91		5.17	91		6.29	91		7.42
135	92		0.55	92		1.68	92		2.81	92		3.94
136	92		5.08	92		6.22	92		7.36	93		0.50
137	93		1.64	93		2.79	93		3.94	93		5.09
138	93		6.24	93		7.39	100		0.55	100		1.71
139	100		2.87	100		4.03	100		5.20	100		6.36
140	100		7.53	101		0.70	101		1.87	101		3.04

CIRCLES

CIRCLES AREA'S in Beer Barrels, Firkins, Gallons, &c. six Inches.

	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
ID.	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
141	9	0	8.22	9	1	0.40	9	1	1.58	9	1	2.76
142	9	1	3.95	9	1	5.14	9	1	6.33	9	1	7.52
143	9	1	8.71	9	2	0.91	9	2	2.11	9	2	3.31
144	9	2	4.51	9	2	5.71	9	2	6.92	9	2	8.13
145	9	3	0.34	9	3	1.55	9	3	2.77	9	3	3.98
146	9	3	5.20	9	3	6.42	9	3	7.65	9	3	8.87
147	10	0	1.10	10	0	2.33	10	0	3.56	10	0	4.79
148	10	0	6.03	10	0	7.27	10	0	8.51	10	0	9.75
149	10	1	1.99	10	1	3.24	10	1	4.49	10	1	5.74
150	10	1	6.99	10	1	8.24	10	2	0.50	10	2	1.76
151	10	2	3.02	10	2	4.28	10	2	5.55	10	2	6.81
152	10	2	8.08	10	3	0.35	10	3	1.62	10	3	2.89
153	10	3	4.17	10	3	5.45	10	3	6.73	10	3	8.02
154	11	0	0.31	11	0	1.60	11	0	2.89	11	0	4.18
155	11	0	5.47	11	0	6.76	11	0	8.06	11	0	9.36
156	11	1	1.66	11	1	2.96	11	1	4.27	11	1	5.58
157	11	1	6.89	11	1	8.20	11	2	0.52	11	2	1.84
158	11	2	3.16	11	2	4.48	11	2	5.81	11	2	7.14
159	11	2	8.46	11	3	0.79	11	3	2.12	11	3	3.45
160	11	3	4.79	11	3	6.13	11	3	7.47	11	3	8.81

CIRCLES

CIRCLES AREA'S in Ale
Barrels, Firkins, Gallons, &c. six
Inches.

I.D.	0			$\frac{1}{2}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G. P.	B	F	G. P.	B	F	G. P.	B	F	G. P.
141	10	1	4.22	10	1	5.40	10	1	6.58	10	1	7.76
142	10	2	0.95	10	2	2.14	10	2	3.33	10	2	4.52
143	10	2	5.71	10	3	6.91	10	3	0.11	10	3	1.31
144	10	3	2.51	10	3	3.71	11	3	4.92	10	3	6.13
145	10	3	7.34	11	0	0.55	11	0	1.77	11	0	2.98
146	11	0	4.20	11	0	5.42	11	0	6.65	11	0	7.87
147	11	1	1.10	11	1	2.33	11	1	3.56	11	1	4.79
148	11	1	6.03	11	1	7.27	11	2	0.51	11	2	1.75
149	11	2	2.99	11	2	4.24	11	2	5.59	11	2	6.74
150	11	2	7.99	11	3	1.24	11	3	2.50	11	3	3.76
151	11	3	5.02	11	3	6.28	11	3	7.55	12	0	0.81
152	12	0	2.08	12	0	3.35	12	0	4.62	12	0	5.89
153	12	0	7.17	12	1	0.45	12	1	1.73	12	1	3.02
154	12	1	4.31	12	1	5.60	12	1	6.89	12	2	0.18
155	12	2	1.47	12	2	2.76	12	2	4.06	12	2	5.36
156	12	2	6.66	12	2	7.96	12	3	1.27	12	3	2.58
157	12	3	4.89	12	3	5.20	12	3	6.52	12	3	7.87
158	13	0	1.16	13	0	2.48	13	0	3.81	13	0	4.14
159	13	0	6.46	13	0	7.79	13	1	1.12	13	1	2.45
160	13	1	3.70	13	1	5.13	13	1	6.47	13	1	7.81

CIRCLES ARE A'S in Beer
Barrels, Firkins, Gallons, &c. six
Inches.

I.D.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{2}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
161	12	0	1.15	12	0	2.50	12	0	3.85	12	0	5.20
162	12	0	6.55	12	0	7.91	12	1	0.27	12	1	1.63
163	12	1	2.99	12	1	4.35	12	1	5.71	12	1	7.07
164	12	1	8.44	12	2	0.81	12	2	2.19	12	2	3.56
165	12	2	4.94	12	2	6.32	12	2	7.70	12	3	0.08
166	12	3	1.47	12	3	2.86	12	3	4.25	12	3	5.64
167	12	3	7.04	12	3	8.44	13	0	0.85	13	0	2.26
168	13	0	3.64	13	0	5.05	13	0	6.46	13	0	7.87
169	13	1	0.27	13	1	1.68	13	1	3.10	13	1	4.52
170	13	1	5.94	13	1	7.36	13	1	8.78	13	2	1.20
171	13	2	2.63	13	2	4.06	13	2	5.49	13	2	6.92
172	13	2	8.36	13	3	0.80	13	3	2.24	13	3	3.68
173	13	3	5.13	13	3	6.57	13	3	8.01	14	0	0.56
174	14	0	1.93	14	0	3.38	14	0	4.84	14	0	6.30
175	14	0	7.76	14	1	0.22	14	1	1.69	14	1	3.16
176	14	1	4.63	14	1	6.10	14	1	7.58	14	2	0.06
177	14	2	1.53	14	2	3.01	14	2	4.49	14	2	5.97
178	14		7.45	14	2	8.94	14	3	1.43	14	3	2.92
179	14		4.42	14	3	5.92	14	3	7.42	14	3	8.92
180	15	0	1.42	15	0	2.92	15	0	4.43	15	0	5.94

CIRCLE S

CIRCLES ARE A'S in Ale
Barrels, Firkins, Gallons, &c. six
Inches.

I.D.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
161	13	2	1.15	13	2	2.50	13	2	3.85	13	2	5.20
162	13	2	6.55	13	2	7.91	13	3	1.27	13	3	2.63
163	13	3	3.99	13	3	5.35	13	3	6.71	13	3	8.07
164	14	0	1.44	14	0	2.81	14	0	4.19	14	0	5.56
165	14	0	6.94	14	1	0.32	14	1	1.70	14	1	3.08
166	14	1	4.47	14	1	5.86	14	1	7.25	14	2	0.64
167	14	2	2.04	14	2	3.44	14	2	4.85	14	2	6.26
168	14	2	7.64	14	3	1.05	14	3	2.46	14	3	3.87
169	14	3	5.27	14	3	6.68	15	0	0.10	15	0	1.52
170	15	0	2.94	15	0	4.36	15	0	5.78	15	0	7.20
171	15	1	0.63	15	1	2.06	15	1	3.49	15	1	4.92
172	15	1	6.36	15	1	7.80	15	2	1.24	15	2	2.68
173	15	2	4.13	15	2	5.57	15	2	7.01	15	3	0.56
174	15	3	1.93	15	3	3.38	15	3	4.84	15	3	6.30
175	15	3	7.76	16	0	1.22	16	0	2.69	16	0	4.16
176	16	0	5.63	16	0	7.10	16	1	0.58	16	1	2.06
177	16	1	3.53	16	1	5.01	16	2	6.49	16	1	7.97
178	16	2	1.45	16	2	2.94	16	2	4.43	16	2	5.92
179	16	2	7.42	16	3	0.92	16	3	2.42	16	3	3.92
180	16	3	5.42	16	3	6.92	17	0	0.43	17	0	1.94

CIRCLES AREA'S in Beer
Barrels, Firkins, Gallons, &c. six
Inches.

I.D.	0		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B|F	G.P.	B|F	G.P.	B|F	G. P.	B|F	G. P.
181	15 0	7.45	15 0	8.96	15 1	1.48	15 1	3.00
182	15 1	4.52	15 1	6.0	15 1	7.57	15 4	0.09
183	15 2	1.62	15 2	3.15	15 2	4.68	15 2	6.21
184	1 2	7.75	15 3	0.29	15 3	1.83	15 3	3.37
185	15 3	4.92	15 3	6.47	15 3	8.02	16 0	0.57
186	16 0	2.12	16 0	3.67	16 0	5.23	16 0	6.79
187	16 0	8.35	16 1	0.91	16 1	2.48	16 1	4.05
188	16 1	5.62	16 1	7.19	16 1	8.77	16 2	1.34
189	16 2	2.92	16 2	4.50	16 2	6.08	16 2	7.66
190	16 3	0.25	16 3	1.84	16 3	3.43	16 3	5.02
191	16 3	6.62	16 3	8.22	17 0	0.82	17 0	2.42
192	17 0	4.02	17 0	5.62	17 0	7.23	17 0	8.84
193	17 1	1.45	17 1	3.06	17 1	4.68	17 1	6.30
194	17 1	7.92	17 2	0.54	17 2	2.17	17 2	3.80
195	17 2	5.42	17 2	7.05	17 2	8.68	17 3	1.31
196	17 3	2.95	18 3	4.59	17 3	6.23	17 3	7.87
197	18 0	0.52	18 0	2.17	18 0	3.85	18 0	5.50
198	18 0	7.12	18 0	8.77	18 1	1.43	18 1	3.09
199	18 1	4.75	18 1	6.43	18 1	8.11	18 2	0.78
200	18 2	2.42	19 2	4.09	18 2	5.77	18 2	7.44

CIRCLES

CIRCLES AREA'S in Ale
Barrels, Firkins, Gallons, &c. six
Inches.

	0		$\frac{1}{2}$		$\frac{1}{3}$		$\frac{3}{4}$	
I.D.	B.F.	G.P.	B.F.	G.P.	B.F.	G.P.	B.F.	G.P.
181	17	3.45	17 0	4.96	17 0	6.48	17	10.00
182	17 1	1.52	17 1	3.04	17 1	4.57	17	16.09
183	17 1	7.62	17 2	1.15	17 2	2.68	17 2	4.21
184	17 2	5.75	17 2	7.29	17 3	0.83	17 3	2.37
185	17 2	4.92	17 3	6.47	18 0	0.02	18 0	1.57
186	18 0	2.12	18 0	3.67	18 0	5.23	18 0	6.79
187	18 1	0.35	18 1	1.91	18 1	3.48	18 1	5.05
188	18 1	6.62	18 2	0.19	18 2	1.77	18 2	3.34
189	18 2	4.92	18 2	6.50	18 3	0.08	18 3	0.66
190	18 3	3.25	18 3	4.84	18 3	6.43	19 0	0.02
191	19 0	1.62	19 0	3.22	19 0	4.82	19 0	6.42
192	19 1	0.02	19 1	1.62	19 1	3.23	19 1	4.84
193	19 1	6.45	19 2	0.06	19 2	1.68	19 2	3.30
194	19 2	4.92	19 2	6.54	19 3	0.17	19 3	1.80
195	19 3	3.42	19 3	5.05	19 3	6.68	20 0	0.31
196	20 0	1.95	20 0	3.59	20 0	5.23	20 0	6.87
197	20 1	0.52	20 1	1.17	20 1	3.85	20 1	5.50
198	20 1	7.12	20 2	0.77	20 2	2.43	20 2	4.09
199	20 2	4.75	20 3	0.43	20 3	1.11	20 3	2.78
200	20 3	4.42	20 3	6.09	20 3	7.77	21	1.44

CIRCLES AREAS in Beer
Barrels, Firkins, Gallons, &c. fix
Inches.

I.D.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
201	18	3	0.12	18	3	1.80	18	3	3.49	18	3	5.17
202	18	3	6.86	18	3	8.55	19	0	1.24	19	0	2.93
203	19	0	4.63	19	0	6.33	19	0	8.03	19	1	0.73
204	19	1	2.43	19	1	4.14	19	1	5.86	19	1	7.58
205	19	2	0.26	19	2	1.97	19	2	3.69	19	2	5.41
206	19	2	7.13	19	2	8.85	19	3	1.57	19	3	3.30
207	19	3	5.03	19	3	6.76	19	3	8.49	20	0	1.23
208	20	0	2.97	20	0	4.71	20	0	6.45	20	0	8.19
209	20	1	0.93	20	1	2.68	20	1	4.43	20	1	6.18
210	20	1	7.94	20	2	0.69	20	2	2.45	20	2	4.21
211	20	2	5.97	20	2	7.73	20	3	0.50	20	3	2.27
212	20	3	4.04	20	3	5.81	20	3	7.59	21	0	0.36
213	21	0	2.14	21	0	3.92	21	0	5.71	21	0	7.49
214	21	1	0.28	21	1	2.07	21	1	3.86	21	1	5.65
215	21	1	7.45	21	2	0.25	21	2	2.05	21	2	3.85

CIRCLES

CIRCLES AREA'S in Ale
Barrels, Firkins, Gallons, &c. six
Inches.

I.D.	0			$\frac{1}{2}$			$\frac{1}{3}$			$\frac{1}{4}$		
	B	F	G. P.	B	F	G. P.	B	F	G. P.	B	F	G. P.
201	21	0	3.12	21	0	1.80	21	0	6.47	21	1	0.17
202	21	1	1.86	21	1	3.55	21	1	5.24	21	1	6.93
203	21	2	0.63	21	2	2.33	21	2	4.03	21	2	5.73
204	21	2	7.43	21	3	1.14	21	3	2.86	21	3	4.58
205	21	3	6.26	21	3	7.97	22	0	1.69	22	0	3.41
206	22	0	5.13	22	0	6.85	22	1	0.57	22	1	2.30
207	22	1	4.03	22	1	5.76	22	1	7.49	22	2	1.23
208	22	2	2.97	22	2	4.71	22	2	6.45	22	3	0.19
209	22	3	1.93	22	3	3.68	22	3	5.43	22	3	7.18
210	23	0	0.94	23	0	2.69	23	0	4.45	23	0	6.21
211	23	0	7.93	23	1	1.73	23	1	3.50	23	1	5.27
212	23	1	7.04	23	2	0.81	23	2	2.59	23	2	4.36
213	23	2	6.14	23	2	7.92	23	3	1.71	23	3	3.49
214	23	3	5.28	23	3	7.07	24	0	0.86	24	0	2.65
215	24	0	4.45	24	0	6.25	24	1	0.05	24	1	1.85

CIRCLES AREAS in Beer
Barrels, Firkins, Gallons, &c. one
Inch.

I. D.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G. P.	B	F	G. P.	B	F	G. P.	B	F	G. P.
1	0	0	0.00	0	0	0.00	0	0	0.01	0	0	0.01
2	0	0	0.01	0	0	0.01	0	0	0.02	0	0	0.02
3	0	0	0.03	0	0	0.03	0	0	0.03	0	0	0.04
4	0	0	0.04	0	0	0.05	0	0	0.06	0	0	0.06
5	0	0	0.07	0	0	0.08	0	0	0.08	0	0	0.09
6	0	0	0.10	0	0	0.11	0	0	0.12	0	0	0.13
7	0	0	0.14	0	0	0.15	0	0	0.16	0	0	0.17
8	0	0	0.18	0	0	0.19	0	0	0.20	0	0	0.21
9	0	0	0.23	0	0	0.24	0	0	0.25	0	0	0.26
10	0	0	0.28	0	0	0.29	0	0	0.31	0	0	0.32
11	0	0	0.34	0	0	0.35	0	0	0.37	0	0	0.38
12	0	0	0.40	0	0	0.42	0	0	0.44	0	0	0.45
13	0	0	0.47	0	0	0.49	0	0	0.51	0	0	0.53
14	0	0	0.55	0	0	0.57	0	0	0.59	0	0	0.61
15	0	0	0.63	0	0	0.65	0	0	0.67	0	0	0.69
16	0	0	0.71	0	0	0.74	0	0	0.76	0	0	0.78
17	0	0	0.80	0	0	0.83	0	0	0.85	0	0	0.87
18	0	0	0.90	0	0	0.93	0	0	0.95	0	0	0.98
19	0	0	1.00	0	0	1.03	0	0	1.06	0	0	1.08
20	0	0	1.11	0	0	1.14	0	0	1.17	0	0	1.19

CIRCLES

CIRCLES AREA'S in Ale
Barrels, Firkins, Gallons, &c. one
Inch.

I.D.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G. P.	B	F	G. P.	B	F	G. P.	B	F	G. P.
1	0	0	0.00	0	0	0.00	0	0	0.01	0	0	0.01
2	0	0	0.01	0	0	0.01	0	0	0.02	0	0	0.02
3	0	0	0.03	0	0	0.03	0	0	0.03	0	0	0.04
4	0	0	0.04	0	0	0.05	0	0	0.06	0	0	0.06
5	0	0	0.07	0	0	0.08	0	0	0.08	0	0	0.09
6	0	0	0.10	0	0	0.11	0	0	0.12	0	0	0.13
7	0	0	0.14	0	0	0.15	0	0	0.16	0	0	0.17
8	0	0	0.18	0	0	0.19	0	0	0.20	0	0	0.21
9	0	0	0.23	0	0	0.24	0	0	0.25	0	0	0.26
10	0	0	0.28	0	0	0.29	0	0	0.31	0	0	0.32
11	0	0	0.34	0	0	0.35	0	0	0.37	0	0	0.38
12	0	0	0.40	0	0	0.42	0	0	0.44	0	0	0.45
13	0	0	0.47	0	0	0.49	0	0	0.51	0	0	0.52
14	0	0	0.55	0	0	0.57	0	0	0.59	0	0	0.60
15	0	0	0.63	0	0	0.65	0	0	0.67	0	0	0.69
16	0	0	0.71	0	0	0.74	0	0	0.76	0	0	0.78
17	0	0	0.80	0	0	0.83	0	0	0.85	0	0	0.87
18	0	0	0.90	0	0	0.93	0	0	0.95	0	0	0.98
19	0	0	1.00	0	0	1.03	0	0	1.06	0	0	1.08
20	0	0	1.11	0	0	1.14	0	0	1.17	0	0	1.19

CIRCLES

CIRCLES AREA'S in Beer
Barrels, Firkins, Gallons, &c. one
Inch.

I.D.	0		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B	F|G.P.	B	F|G.P.	B	F|G.P.	B	F|G.P.
21	0	0 1.23	0	0 1.26	0	0 1.29	0	0 1.31
22	0	0 1.35	0	0 1.38	0	0 1.41	0	0 1.44
23	0	0 1.47	0	0 1.51	0	0 1.54	0	0 1.56
24	0	0 1.60	0	0 1.64	0	0 1.67	0	0 1.70
25	0	0 1.74	0	0 1.78	0	0 1.81	0	0 1.84
26	0	0 1.88	0	0 1.92	0	0 1.96	0	0 1.99
27	0	0 2.03	0	0 2.07	0	0 2.11	0	0 2.15
28	0	0 2.18	0	0 2.22	0	0 2.26	0	0 2.30
29	0	0 2.34	0	0 2.38	0	0 2.42	0	0 2.47
30	0	0 2.51	0	0 2.55	0	0 2.59	0	0 2.63
31	0	0 2.68	0	0 2.72	0	0 2.76	0	0 2.81
32	0	0 2.85	0	0 2.90	0	0 2.94	0	0 2.99
33	0	0 3.03	0	0 3.08	0	0 3.13	0	0 3.17
34	0	0 3.22	0	0 3.27	0	0 3.32	0	0 3.36
35	0	0 3.41	0	0 3.46	0	0 3.51	0	0 3.56
36	0	0 3.61	0	0 3.66	0	0 3.71	0	0 3.76
37	0	0 3.81	0	0 3.86	0	0 3.92	0	0 3.97
38	0	0 4.02	0	0 4.07	0	0 4.13	0	0 4.18
39	0	0 4.24	0	0 4.29	0	0 4.35	0	0 4.40
40	0	0 4.46	0	0 4.51	0	0 4.57	0	0 4.62

CIRCLES

CIRCLES AREAS in Ale
Barrels, Firkins, Gallons, &c. one
Inch.

I.D.	0.		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B	F|G.P.	B	F|G.P.	B	F|G.P.	B	F|G.P.
21	0	0 1.23	0	0 1.26	0	0 1.29	0	0 1.31
22	0	0 1.35	0	0 1.38	0	0 1.41	0	0 1.44
23	0	0 1.47	0	0 1.51	0	0 1.54	0	0 1.56
24	0	0 1.60	0	0 1.64	0	0 1.67	0	0 1.70
25	0	0 1.74	0	0 1.78	0	0 1.81	0	0 1.84
26	0	0 1.88	0	0 1.92	0	0 1.96	0	0 1.99
27	0	0 2.03	0	0 2.07	0	0 2.11	0	0 2.15
28	0	0 2.18	0	0 2.22	0	0 2.26	0	0 2.30
29	0	0 2.34	0	0 2.38	0	0 2.42	0	0 2.47
30	0	0 2.51	0	0 2.55	0	0 2.55	0	0 2.63
31	0	0 2.68	0	0 2.72	0	0 2.76	0	0 2.81
32	0	0 2.85	0	0 2.90	0	0 2.94	0	0 2.99
33	0	0 3.03	0	0 3.08	0	0 3.13	0	0 3.17
34	0	0 3.22	0	0 3.27	0	0 3.32	0	0 3.36
35	0	0 3.41	0	0 3.46	0	0 3.51	0	0 3.56
36	0	0 3.61	0	0 3.66	0	0 3.71	0	0 3.76
37	0	0 3.81	0	0 3.86	0	0 3.92	0	0 3.97
38	0	0 4.02	0	0 4.07	0	0 4.13	0	0 4.18
39	0	0 4.24	0	0 4.29	0	0 4.35	0	0 4.40
40	0	0 4.46	0	0 4.51	0	0 4.57	0	0 4.62

CIRCLES

CIRCLES AREA'S in Beer
 Barrels, Firkins, Gallons, &c. one
 Inch.

I.D.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
41	0	0	4.68	0	0	4.74	0	0	4.80	0	0	4.85
42	0	0	4.91	0	0	4.97	0	0	5.03	0	0	5.09
43	0	0	5.15	0	0	5.21	0	0	5.27	0	0	5.33
44	0	0	5.39	0	0	5.45	0	0	5.52	0	0	5.58
45	0	0	5.64	0	0	5.70	0	0	5.77	0	0	5.83
46	0	0	5.89	0	0	5.96	0	0	6.02	0	0	6.09
47	0	0	6.15	0	0	6.22	0	0	6.28	0	0	6.35
48	0	0	6.42	0	0	6.48	0	0	6.55	0	0	6.62
49	0	0	6.69	0	0	6.76	0	0	6.82	0	0	6.89
50	0	0	6.96	0	0	7.03	0	0	7.10	0	0	7.17
51	0	0	7.24	0	0	7.32	0	0	7.39	0	0	7.46
52	0	0	7.53	0	0	7.60	0	0	7.68	0	0	7.75
53	0	0	7.82	0	0	7.90	0	0	7.97	0	0	8.05
54	0	0	8.12	0	0	8.20	0	0	8.27	0	0	8.35
55	0	0	8.42	0	0	8.50	0	0	8.58	0	0	8.66
56	0	0	8.73	0	0	8.81	0	0	8.89	0	0	8.97
57	0	I	0.05	0	I	0.13	0	I	0.21	I	I	0.29
58	0	I	0.37	0	I	0.45	0	I	0.53	I	I	0.61
59	0	I	0.69	0	I	0.78	0	I	0.86	I	I	0.94
60	0	I	1.03	0	I	1.11	0	I	1.19	I	I	1.28

CIRCLES

CIRCLES AREA'S in Ale
Barrels, Firkins, Gallons, &c. one
Inch.

I.D.	0.			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
41	0	0	4.68	0	0	4.74	0	0	4.80	0	0	4.85
42	0	0	4.91	0	0	4.97	0	0	5.03	0	0	5.09
43	0	0	5.15	0	0	5.21	0	0	5.27	0	0	5.33
44	0	0	5.39	0	0	5.45	0	0	5.52	0	0	5.58
45	0	0	5.64	0	0	5.70	0	0	5.77	0	0	5.83
46	0	0	5.89	0	0	5.96	0	0	6.02	0	0	6.09
47	0	0	6.15	0	0	6.22	0	0	6.28	0	0	6.35
48	0	0	6.42	0	0	6.48	0	0	6.55	0	0	6.62
49	0	0	6.69	0	0	6.76	0	0	6.82	0	0	6.89
50	0	0	6.96	0	0	7.03	0	0	7.10	0	0	7.17
51	0	0	7.24	0	0	7.32	0	0	7.39	0	0	7.46
52	0	0	7.53	0	0	7.60	0	0	7.68	0	0	7.75
53	0	0	7.82	0	0	7.90	0	0	7.97	0	1	0.05
54	0	1	0.12	0	1	0.20	0	1	0.27	0	1	0.35
55	0	1	0.42	0	1	0.50	0	1	0.58	0	1	0.66
56	0	1	0.73	0	1	0.81	0	1	0.89	0	1	0.97
57	0	1	1.05	0	1	1.13	0	1	1.21	0	1	1.29
58	0	1	1.37	0	1	1.45	0	1	1.53	0	1	1.61
59	0	1	1.69	0	1	1.78	0	1	1.86	0	1	1.94
60	0	1	2.03	0	1	1.11	0	1	2.19	0	1	2.28

CIRCLES

CIRCLES ARE A'S in Beer
Barrels, Firkins, Gallons, &c. one
Inch.

I.D.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
61	0	1	1.36	0	1	1.45	0	1	1.53	0	1	1.62
62	0	1	1.70	0	1	1.79	0	1	1.88	0	1	1.97
63	0	1	2.05	0	1	2.14	0	1	2.23	0	1	2.32
64	0	1	2.41	0	1	2.50	0	1	2.59	0	1	2.68
65	0	1	2.77	0	1	2.86	0	1	2.95	0	1	3.04
66	0	1	3.13	0	1	3.22	0	1	2.32	0	1	3.41
67	0	1	3.50	0	1	3.60	0	1	3.69	0	1	3.78
68	0	1	3.88	0	1	3.97	0	1	4.07	0	1	4.16
69	0	1	4.26	0	1	4.36	0	1	4.45	0	1	4.55
70	0	1	4.65	0	1	4.74	0	1	4.84	0	1	4.94
71	0	1	5.04	0	1	5.14	0	1	5.24	0	1	5.34
72	0	1	5.44	0	1	5.54	0	1	5.64	0	1	5.74
73	0	1	5.84	0	1	5.94	0	1	6.05	0	1	6.15
74	0	1	6.25	0	1	6.35	0	1	6.46	0	1	6.56
75	0	1	6.67	0	1	6.77	0	1	6.88	0	1	6.98
76	0	1	7.09	0	1	7.19	0	1	7.30	0	1	7.41
77	0	1	7.51	0	1	7.62	0	1	7.73	0	1	7.84
78	0	1	7.94	0	1	8.05	0	1	8.16	0	1	8.27
79	0	1	8.38	0	1	8.49	0	1	8.60	0	1	8.71
80	0	1	8.82	0	1	8.94	0	2	9.05	0	2	9.16

CIRCLES

CIRCLES AREA'S in Ale
Barrels, Firkins, Gallons, &c. one
Inch.

I.D.	0		B|F|G.P.	$\frac{1}{4}$		B|F|G.P.	$\frac{1}{2}$		B|F|G.P.	$\frac{3}{4}$		B|F|G.P.
	○	I		○	I		○	I		○	I	
61	○	I	2.36	○	I	2.45	○	I	2.53	○	I	2.62
62	○	I	2.70	○	I	2.79	○	I	2.88	○	I	2.97
63	○	I	3.05	○	I	3.14	○	I	3.23	○	I	3.32
64	○	I	3.41	○	I	3.50	○	I	3.59	○	I	3.68
65	○	I	3.77	○	I	3.86	○	I	3.95	○	I	4.04
66	○	I	4.13	○	I	4.22	○	I	4.32	○	I	4.41
67	○	I	4.50	○	I	4.60	○	I	4.69	○	I	4.78
68	○	I	4.88	○	I	4.97	○	I	5.07	○	I	5.16
69	○	I	5.26	○	I	5.36	○	I	5.45	○	I	5.55
70	○	I	5.65	○	I	5.74	○	I	5.84	○	I	5.94
71	○	I	6.05	○	I	6.14	○	I	6.24	○	I	6.34
72	○	I	6.44	○	I	6.54	○	I	6.64	○	I	6.74
73	○	I	6.84	○	I	6.94	○	I	7.05	○	I	7.15
74	○	I	7.25	○	I	7.35	○	I	7.46	○	I	7.56
75	○	I	7.67	○	I	7.77	○	I	7.88	○	I	7.98
76	○	2	0.09	○	2	0.19	○	2	0.30	○	2	0.41
77	○	2	0.51	○	2	0.62	○	2	0.73	○	2	0.84
78	○	2	0.94	○	2	1.05	○	2	1.16	○	2	1.27
79	○	2	1.38	○	2	1.49	○	2	1.60	○	2	1.71
80	○	2	1.82	○	2	1.94	○	2	2.05	○	2	2.16

CIRCLES

CIRCLES AREA'S in Beer
Barrels, Firkins, Gallons, &c. one
Inch.

I.D.	0			$\frac{1}{2}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
81	0	2	0.27	0	2	0.39	0	2	0.50	0	2	0.61
82	0	2	0.73	0	2	0.84	0	2	0.96	0	2	1.07
83	0	2	1.19	0	2	1.30	0	2	1.42	0	2	1.53
84	0	2	1.65	0	2	1.77	0	2	1.89	0	2	2.00
85	0	2	2.12	0	2	2.24	0	2	2.36	0	2	2.48
86	0	2	2.60	0	2	2.72	0	2	2.84	0	2	2.96
87	0	2	3.08	0	2	3.20	0	2	3.32	0	2	3.45
88	0	2	3.57	0	2	3.69	0	2	3.81	0	2	3.94
89	0	2	4.06	0	2	4.18	0	2	4.31	0	2	4.43
90	0	2	4.56	0	2	4.68	0	2	4.81	0	2	4.94
91	0	2	5.06	0	2	5.19	0	2	5.32	0	2	5.45
92	0	2	5.57	0	2	5.70	0	2	5.83	0	2	5.96
93	0	2	6.09	0	2	6.22	0	2	6.35	0	2	6.48
94	0	2	6.61	0	2	6.74	0	2	6.84	0	2	7.00
95	0	2	7.14	0	2	7.27	0	2	7.40	0	2	7.53
96	0	2	7.67	0	2	7.80	0	2	7.94	0	2	8.07
97	0	2	8.21	0	2	8.34	0	2	8.48	0	2	8.61
98	0	2	8.75	0	2	8.88	0	3	0.02	0	3	0.16
99	0	3	0.30	0	3	0.43	0	3	0.57	0	3	0.71
100	0	3	0.85	0	3	0.99	0	3	1.13	0	3	1.27

CIRCLES

CIRCLES AREAS in Ale
Barrels, Firkins, Gallons, &c. one
Inch.

I.D.	0			$\frac{1}{2}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
81	0	2	2.27	0	2	2.39	0	2	2.50	0	2	2.41
82	0	2	2.73	0	2	2.84	0	2	2.96	0	2	3.07
83	0	2	3.19	0	2	3.30	0	2	3.42	0	2	3.53
84	0	2	3.65	0	2	3.77	0	2	3.89	0	2	4.00
85	0	2	4.12	0	2	4.24	0	2	4.36	0	2	4.48
86	0	2	4.60	0	2	4.72	0	2	4.84	0	2	4.96
87	0	2	5.08	0	2	5.20	0	2	5.32	0	2	5.45
88	0	2	5.57	0	2	5.69	0	2	5.81	0	2	5.94
89	0	2	6.06	0	2	6.18	0	2	6.31	0	2	6.43
90	0	2	6.56	0	2	6.68	0	2	6.81	0	2	6.94
91	0	2	7.06	0	2	7.19	0	2	7.32	0	2	7.45
92	0	2	7.57	0	2	7.70	0	2	7.83	0	2	7.96
93	0	3	0.09	0	3	0.22	0	3	0.35	0	3	0.48
94	0	3	0.61	0	3	0.74	0	3	0.87	0	3	1.00
95	0	3	1.14	0	3	1.27	0	3	1.40	0	3	1.53
96	0	3	1.67	0	3	1.80	0	3	1.94	0	3	2.07
97	0	3	2.21	0	3	2.34	0	3	2.48	0	3	2.61
98	0	3	2.75	0	3	2.88	0	3	3.02	0	3	3.16
99	0	3	3.30	0	3	3.43	0	3	3.57	0	3	3.71
100	0	3	3.85	0	3	3.99	0	3	4.13	0	3	4.27

R

CIRCLES

CIRCLES AREA'S in Beer
Barrels, Firkins, Gallons, &c. one
Inch.

	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B.	D.	G.P.	B.	D.	G.P.	B.	D.	G.P.	B.	D.	G.P.
101	0	3	1.41	0	3	1.55	0	3	1.69	0	3	1.83
102	0	3	1.98	0	3	2.11	0	3	2.26	0	3	2.40
103	0	3	2.55	0	3	2.69	0	3	2.83	0	3	2.98
104	0	3	3.12	0	3	3.27	0	3	3.41	0	3	4.56
105	0	3	3.71	0	3	3.85	0	3	4.00	0	3	4.15
106	0	3	4.29	0	3	4.44	0	3	4.59	0	3	4.74
107	0	3	4.89	0	3	5.03	0	3	5.19	0	3	5.34
108	0	3	5.49	0	3	5.64	0	3	5.79	0	3	5.94
109	0	3	6.09	0	3	6.24	0	3	6.40	0	3	6.55
110	0	3	6.70	0	3	6.85	0	3	7.01	0	3	7.16
111	0	3	7.32	0	3	7.47	0	3	7.63	0	3	7.78
112	0	3	7.94	0	3	8.09	0	3	8.25	0	3	8.40
113	0	3	8.56	0	3	8.72	0	3	8.88	1	0	0.04
114	1	0	0.20	1	0	0.35	1	0	0.51	1	0	0.67
115	1	0	0.83	1	0	0.99	1	0	1.15	1	0	1.31
116	1	0	1.48	1	0	1.64	1	0	1.80	1	0	1.96
117	1	0	2.13	1	0	2.29	1	0	2.45	1	0	2.62
118	1	0	2.78	1	0	2.94	1	0	3.11	1	0	3.27
119	1	0	3.44	1	0	3.61	1	0	3.77	1	0	3.94
120	1	0	4.11	1	0	4.27	1	0	4.44	1	0	4.61

CIRCLES

CIRCLES AREA'S in Ale Barrels, Firkins, Gallons, &c. one Inch;

I.D.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
101	0	3	4.41	0	3	4.55	0	3	4.69	0	3	4.83
102	0	3	4.98	0	3	5.11	0	3	5.26	0	3	5.40
103	0	3	5.55	0	3	5.69	0	3	5.83	0	3	5.98
104	0	3	6.12	0	3	6.27	0	3	6.41	0	3	6.56
105	0	3	6.71	0	3	6.85	0	3	7.00	0	3	7.15
106	0	3	7.29	0	3	7.44	0	3	7.59	0	3	7.74
107	0	3	7.89	1	0	0.03	1	0	0.19	1	0	0.34
108	1	0	0.49	1	0	0.64	1	0	0.79	1	0	0.94
109	1	0	1.09	1	0	1.24	1	0	1.40	1	0	1.55
110	1	0	1.70	1	0	1.85	1	0	2.01	1	0	2.16
111	1	0	2.32	1	0	2.47	1	0	2.63	1	0	2.78
112	1	0	2.94	1	0	3.09	1	0	3.25	1	0	3.40
113	1	0	3.56	1	0	3.72	1	0	3.88	1	0	4.04
114	1	0	4.20	1	0	4.35	1	0	4.51	1	0	4.67
115	1	0	4.83	1	0	4.99	1	0	5.15	1	0	5.31
116	1	0	5.48	1	0	5.64	1	0	5.80	1	0	5.96
117	1	0	6.13	1	0	6.29	1	0	6.45	1	0	6.62
118	1	0	6.78	1	0	6.94	1	0	7.11	1	0	7.27
119	1	0	7.44	1	0	7.61	1	0	7.77	1	0	7.94
120	1	1	0.11	1	1	0.27	1	1	0.44	1	1	0.61

CIRCLES ARE A'S in Beer
Barrels, Firkins, Gallons, &c. one
Inch.

I.D.	0		$\frac{1}{2}$		$\frac{1}{3}$		$\frac{1}{4}$	
	B	F|G.P.	B	F|G.P.	B	F|G.P.	B	F|G.P.
121	I	0 4.78	I	0 4.98	I	0 5.11	I	0 5.28
122	I	0 5.45	I	0 5.66	I	0 5.79	I	0 5.96
123	I	0 6.14	I	0 6.34	I	0 6.48	I	0 6.65
124	I	0 6.82	I	0 7.03	I	0 7.17	I	0 7.34
125	I	0 7.52	I	0 7.72	I	0 7.87	I	0 8.04
126	I	0 8.22	I	0 8.43	I	0 8.57	I	0 8.74
127	I	0 8.92	I	I 0.13	I	I 0.28	I	I 0.45
128	I	I 0.63	I	I 0.85	I	I 0.99	I	I 1.17
129	I	I 1.35	I	I 1.56	I	I 1.71	I	I 1.89
130	I	I 2.07	I	I 2.29	I	I 2.43	I	I 2.61
131	I	I 2.80	I	I 3.01	I	I 3.16	I	I 3.34
132	I	I 3.53	I	I 3.74	I	I 3.90	I	I 4.08
133	I	I 4.27	I	I 4.49	I	I 4.64	I	I 4.82
134	I	I 5.00	I	I 5.23	I	I 5.38	I	I 5.57
135	I	I 5.76	I	I 5.98	I	I 6.14	I	I 6.32
136	I	I 6.51	I	I 6.74	I	I 6.89	I	I 7.08
137	I	I 7.27	I	I 7.50	I	I 7.66	I	I 7.85
138	I	I 8.04	I	I 8.27	I	I 8.42	I	I 8.62
139	I	I 8.81	I	2 0.04	I	2 0.20	I	2 0.39
140	I	2 0.50	I	2 0.82	I	2 0.98	I	2 1.17

CIRCLES

CIRCLES ARE A'S in Ale Barrels, Firkins, Gallons, &c. one Inch.

I.D.	0		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B	F|G.P.	B	F|G.P.	B	F|G.P.	B	F|G.P.
121	I	I 0.78	I	I 0.98	I	I 1.11	I	I 1.27
222	I	I 1.45	I	I 1.66	I	I 1.79	I	I 1.90
123	I	I 2.14	I	I 2.34	I	I 2.48	I	I 2.65
124	I	I 2.82	I	I 3.03	I	I 3.17	I	I 3.34
125	I	I 3.52	I	I 3.72	I	I 3.87	I	I 4.04
126	I	I 4.22	I	I 4.43	I	I 4.57	I	I 4.74
127	I	I 4.92	I	I 5.13	I	I 5.28	I	I 5.45
128	I	I 5.63	I	I 5.85	I	I 5.99	I	I 6.17
129	I	I 6.35	I	I 6.56	I	I 6.71	I	I 6.89
130	I	I 7.07	I	I 7.29	I	I 7.43	I	I 7.61
131	I	I 7.80	I	2 0.01	I	2 0.16	I	2 0.34
132	I	2 0.53	I	2 0.74	I	2 0.90	I	2 1.08
133	I	2 1.27	I	2 1.49	I	2 1.64	I	2 1.82
134	I	2 2.00	I	2 2.23	I	2 2.38	I	2 2.57
135	I	2 2.76	I	2 2.98	I	2 3.14	I	2 3.32
136	I	2 3.51	I	2 3.74	I	2 3.89	I	2 4.08
137	I	2 4.27	I	2 4.50	I	2 4.66	I	2 4.85
138	I	2 5.04	I	2 5.27	I	2 5.42	I	2 5.62
139	I	2 5.81	I	2 6.04	I	2 6.20	I	2 6.39
140	I	2 6.59	I	2 6.82	I	2 6.98	I	2 7.17

CIRCLES AREA'S in Beer
Barrels, Firkins, Gallons, &c. one
Inch,

	0			$\frac{1}{12}$			$\frac{1}{6}$			$\frac{1}{4}$		
I.D	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
141	1	2	1.37	1	2	1.57	1	2	1.76	1	2	1.96
142	1	2	2.16	1	2	2.36	1	2	2.55	1	2	2.75
143	1	2	2.95	1	2	3.15	1	2	3.35	1	2	3.55
144	1	2	3.75	1	2	3.95	1	2	4.15	1	2	4.36
145	1	2	4.56	1	2	4.76	1	2	4.96	1	2	5.16
146	1	2	5.37	1	2	5.57	1	2	5.77	1	2	5.98
147	1	2	6.18	1	2	6.39	1	2	6.59	1	2	6.80
148	1	2	7.00	1	2	7.21	1	2	7.42	1	2	7.62
149	1	2	7.83	1	2	8.04	1	2	8.25	1	2	8.46
150	1	2	8.66	1	2	8.87	1	3	9.08	1	3	9.29
151	1	3	0.50	1	3	0.71	1	3	0.92	1	3	1.14
152	1	3	1.35	1	3	1.56	1	3	1.77	1	3	1.98
153	1	3	2.20	1	3	2.41	1	3	2.62	1	3	2.84
154	1	3	3.05	1	3	3.27	1	3	3.48	1	3	3.70
155	1	3	3.91	1	3	4.12	1	3	4.34	1	3	4.56
156	1	3	4.70	1	3	5.00	1	3	5.21	1	3	5.43
157	1	3	5.65	1	3	5.87	1	3	6.09	1	3	6.31
158	1	3	6.53	1	3	6.75	1	3	6.97	1	3	7.18
159	1	3	7.41	1	3	7.63	1	3	7.85	1	3	8.07
160	1	3	8.20	1	3	8.52	1	3	8.74	1	3	8.97

CIRCLES

CIRCLES AREAS in Ale
Barrels, Firkins, Gallons, &c. one
Inch.

I.D.	0		$\frac{1}{2}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B	F|G.P.	B	F|G.P.	B	F|G.P.	B	F|G.P.
141	1	2 7.37	1	2 7.57	1	2 7.76	1	2 7.96
142	1	3 0.16	1	3 0.36	1	3 0.55	1	3 0.75
143	1	3 0.95	1	3 1.15	1	3 1.35	1	3 1.55
144	1	3 1.75	1	3 1.95	1	3 2.15	1	3 2.36
145	1	3 2.56	1	3 2.76	1	3 2.96	1	3 3.16
146	1	3 3.37	1	3 3.57	1	3 3.77	1	3 3.98
147	1	3 4.18	1	3 4.39	1	3 4.59	1	3 4.80
148	1	3 5.00	1	3 5.21	1	3 5.42	1	3 5.62
149	1	3 5.83	1	3 6.04	1	3 6.25	1	3 6.46
150	1	3 6.66	1	3 6.87	1	3 7.08	1	3 7.29
151	1	3 7.50	1	3 7.71	1	3 7.92	2	0 0.14
152	2	0 0.35	2	0 0.56	2	0 0.77	2	0 0.98
153	2	0 1.20	2	0 1.41	2	0 1.62	2	0 1.84
154	2	0 2.05	2	0 2.27	2	0 2.48	2	0 2.70
155	2	0 2.91	2	0 3.12	2	0 3.34	2	0 3.56
156	2	0 3.78	2	0 4.00	2	0 4.21	2	0 4.43
157	2	0 4.65	2	0 4.87	2	0 5.09	2	0 5.31
158	2	0 5.53	2	0 5.75	2	0 5.97	2	0 6.18
159	2	0 6.41	2	0 6.63	2	0 6.85	2	0 7.07
160	2	0 7.30	2	0 7.52	2	0 7.74	2	0 7.97

CIRCLES ARE A'S in Beer
Barrels, Firkins, Gallons, &c. one
Inch:

I.D.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
161	2	0	0.19	2	0	0.42	2	0	0.64	2	0	0.87
162	2	0	1.09	2	0	1.32	2	0	1.54	2	0	1.77
163	2	0	2.00	2	0	2.22	2	0	2.45	2	0	2.68
164	2	0	2.91	2	0	3.14	2	0	3.37	2	0	3.59
165	2	0	3.82	2	0	4.05	2	0	4.28	2	0	4.52
166	2	0	4.75	2	0	4.98	2	0	5.21	2	0	5.44
167	2	0	5.67	2	0	5.90	2	0	6.14	2	0	6.37
168	2	0	6.61	2	0	6.84	2	0	7.08	2	0	7.31
169	2	0	7.55	2	0	7.78	2	0	8.02	2	0	8.25
170	2	0	8.49	2	0	8.73	2	0	8.96	2	0	0.20
171	2	1	0.44	2	1	0.68	2	1	0.92	2	1	1.15
172	2	1	1.39	2	1	1.63	2	1	1.87	2	1	2.11
173	2	1	2.36	2	1	2.60	2	1	2.84	2	1	3.08
174	2	1	3.32	2	1	3.56	2	1	3.81	2	1	4.05
175	2	1	4.29	2	1	4.54	2	1	4.78	2	1	5.03
176	2	1	5.27	2	1	5.52	2	1	5.76	2	1	6.01
177	2	1	6.26	2	1	6.50	2	1	6.75	2	1	7.00
178	2	1	7.24	2	1	7.49	2	1	7.74	2	1	7.99
179	2	1	8.24	2	1	8.49	2	1	8.74	2	1	8.99
180	2	2	0.24	2	2	0.40	2	2	0.74	2	2	0.90

CIRCLES

CIRCLES AREA'S in Ale
Barrels, Firkins, Gallons, &c. one
Inch.

I.D.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
161	2	1	0.19	2	1	0.42	2	1	0.64	2	1	0.87
162	2	1	1.09	2	1	1.32	2	1	1.54	2	1	1.77
163	2	1	2.00	2	1	2.22	2	1	2.45	2	1	2.68
164	2	1	2.91	2	1	3.14	2	1	3.37	2	1	3.59
165	2	1	3.82	2	1	4.05	2	1	4.28	2	1	4.52
166	2	1	4.75	2	1	4.98	2	1	5.21	2	1	5.44
167	2	1	5.67	2	1	5.90	2	1	6.14	2	1	6.37
168	2	1	6.62	2	1	6.84	2	1	7.08	2	1	7.31
169	2	1	7.55	2	1	7.78	2	2	0.02	2	2	0.25
170	2	2	0.49	2	2	0.73	2	2	0.96	2	2	1.20
171	2	2	1.44	2	1	1.68	2	2	1.92	2	2	2.15
172	2	2	2.39	2	1	2.63	2	2	2.87	2	2	3.11
173	2	2	3.36	2	1	3.60	2	2	3.84	2	2	4.08
174	2	2	4.32	2	1	4.56	2	2	4.81	2	2	5.05
175	2	2	5.29	2	1	5.54	2	2	5.78	2	2	6.03
176	2	2	6.27	2	2	6.52	2	2	6.76	2	2	7.01
177	2	2	7.26	2	2	7.50	2	2	7.75	2	3	0.00
178	2	3	0.24	2	3	0.49	2	3	0.74	2	3	0.99
179	2	3	1.24	2	3	1.49	2	3	1.74	2	3	1.99
180	2	3	2.24	2	3	2.49	2	3	2.74	2	3	2.99

CIRCLES

CIRCLES AREA'S in Beer
Barrels, Firkins, Gallons, &c. one
Inch.

LD.	0			$\frac{1}{2}$			$\frac{1}{3}$			$\frac{1}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
181	2	2	1.24	2	2	1.49	2	2	1.75	2	2	2.00
182	2	2	2.25	2	2	2.50	2	2	2.76	2	2	3.02
183	2	2	3.27	2	2	3.53	2	2	3.78	2	2	4.04
184	2	2	4.29	2	2	4.55	2	2	4.81	2	2	5.06
185	2	2	5.32	2	2	5.58	2	2	5.84	2	2	6.09
186	2	2	6.35	2	2	6.61	2	2	6.87	2	2	7.13
187	2	2	7.39	2	2	7.65	2	2	7.91	2	2	8.18
188	2	2	8.44	2	2	8.70	2	2	8.96	2	3	0.22
189	2	3	0.49	2	3	0.75	2	3	1.01	2	3	1.28
190	2	3	1.54	2	3	1.81	2	3	2.07	2	3	2.34
191	2	3	2.60	2	3	2.87	2	3	3.14	2	3	3.40
192	2	3	3.67	2	3	3.94	2	3	4.21	2	3	4.47
193	2	3	4.74	2	3	5.01	2	3	5.28	2	3	5.55
194	2	3	5.82	2	3	6.09	2	3	6.36	2	3	6.63
195	2	3	6.90	2	3	7.18	2	3	7.45	2	3	7.72
196	2	3	7.99	2	3	8.27	2	3	8.54	2	3	8.81
197	3	0	0.08	3	0	0.36	3	0	0.64	3	0	0.91
198	3	0	1.19	3	0	1.46	3	0	1.74	3	0	2.02
199	3	0	2.29	3	0	2.57	3	0	2.85	3	0	3.13
200	3	0	3.40	3	0	3.68	3	0	3.96	3	0	4.24

CIRCLES

CIRCLES AREAS in Ale
Barrels, Firkins, Gallons, &c. one
Inch.

I.D.	0		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B	F	G.	P.	B	F	G.	P.
181	2	3	3.24	2	3	3.49	2	3
182	2	3	4.25	2	3	4.50	2	3
183	2	3	5.27	2	3	5.53	2	3
184	2	3	6.29	2	3	6.55	2	3
185	2	3	7.32	2	3	7.58	2	3
186	3	0	0.35	3	0	0.61	3	0
187	3	0	1.39	3	0	1.65	3	0
188	3	0	2.44	3	0	2.70	3	0
189	3	0	3.49	3	0	3.75	3	0
190	3	0	4.54	3	0	4.81	3	0
191	3	0	5.60	3	0	5.87	3	0
192	3	0	6.67	3	0	6.94	3	0
193	3	1	7.74	3	1	8.00	3	1
194	3	1	0.82	3	1	1.09	3	1
195	3	1	1.90	3	1	2.18	3	1
196	3	1	2.99	3	1	3.27	3	1
197	3	1	4.08	3	1	4.36	3	1
198	3	1	5.19	3	1	5.46	3	1
199	3	1	6.29	3	1	6.57	3	1
200	3	1	7.40	3	1	7.68	3	1

CIRCLES

CIRCLES AREA'S in Beer
Barrels, Firkins, Gallons, &c. one
Inch.

LD.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
201	3	0	4.52	3	0	4.80	3	0	5.08	3	0	5.36
202	3	0	5.64	3	0	5.92	3	0	6.21	3	0	6.49
203	3	0	6.77	3	0	7.05	3	0	7.34	3	0	7.62
204	3	0	7.90	3	0	8.19	3	0	8.47	3	0	8.76
205	3	1	0.04	3	1	0.33	3	1	0.62	3	1	0.90
206	3	1	1.19	3	1	1.48	3	1	1.76	3	1	2.05
207	3	1	2.34	3	1	2.63	3	1	2.92	3	1	3.21
208	3	1	3.49	3	1	3.78	3	1	4.07	3	1	4.37
209	3	1	4.66	3	1	4.95	3	1	5.24	3	1	5.53
210	3	1	5.82	3	1	6.12	3	1	6.41	3	1	6.70
211	3	1	6.99	3	1	7.29	3	1	7.58	3	1	7.88
212	3	1	8.17	3	1	8.47	3	1	8.76	3	2	0.06
213	3	2	0.36	3	2	0.65	3	2	0.95	3	2	1.25
214	3	2	1.55	3	2	1.84	3	2	2.14	3	2	2.44
215	3	2	2.74	3	2	3.04	3	2	3.34	3	2	3.64

CIRCLES

CIRCLES AREA'S in Ale
Barrels, Firkins, Gallons, &c. one
Inch.

I.D.	0		$\frac{1}{2}$		$\frac{1}{3}$		$\frac{3}{4}$	
	B	F|G.P.	B	F|G.P.	B	F|G.P.	B	F|G.P.
201	3	2 0.52	3	2 0.80	3	2 1.08	3	2 1.36
202	3	2 1.64	3	2 1.92	3	2 2.21	3	2 2.49
203	3	2 2.77	3	2 3.05	3	2 3.34	3	2 3.62
204	3	2 3.90	3	2 4.19	3	2 4.47	3	2 4.76
205	3	2 5.04	3	2 5.33	3	2 5.62	3	2 5.90
206	3	2 6.19	3	2 6.48	3	2 6.76	3	2 7.05
207	3	2 7.34	3	2 7.63	3	2 7.92	3	3 0.21
208	3	3 0.49	3	3 0.78	3	3 1.07	3	3 1.37
209	3	3 1.66	3	3 1.95	3	3 2.24	3	3 2.53
210	3	3 2.82	3	3 3.12	3	3 3.41	3	3 3.70
211	3	3 3.99	3	3 4.29	3	3 4.58	3	3 4.88
212	3	3 5.17	3	3 5.47	3	3 5.76	3	3 6.06
213	3	3 6.36	3	3 6.65	3	3 6.95	3	3 7.25
214	3	3 7.55	3	3 7.84	4	0 0.14	4	0 0.44
215	4	0 0.74	4	0 1.04	4	0 1.34	4	0 1.64

CIRCLES

A TABLE for finding the Content of the Crown of a Copper, $\frac{1}{2}$ the Altitude being one Inch, in Beer Barrels; Firkins, Gallons, &c.

I.D.	0		B|F	G.P.	B|F	G.P.	$\frac{1}{2}$		B|F	G.P.	$\frac{3}{4}$		B|F	G.P.
	B|F	G.P.					B|F	G.P.			B|F	G.P.		
31	0	0	2.68	0	0	3.35	0	0	4.02	0	0	4.69	0	0
32	0	0	2.85	0	0	3.56	0	0	4.27	0	0	4.98	0	0
33	0	0	3.03	0	0	3.79	0	0	4.55	0	0	5.31	0	0
34	0	0	3.22	0	0	4.03	0	0	4.84	0	0	5.64	0	0
35	0	0	3.41	0	0	4.26	0	0	5.12	0	0	5.96	0	0
36	0	0	3.61	0	0	4.51	0	0	5.43	0	0	6.31	0	0
37	0	0	3.81	0	0	4.76	0	0	5.71	0	0	6.66	0	0
38	0	0	4.02	0	0	5.02	0	0	6.03	0	0	7.03	0	0
39	0	0	4.24	0	0	5.30	0	0	6.36	0	0	7.42	0	0
40	0	0	4.47	0	0	5.58	0	0	6.70	0	0	7.82	0	0
41	0	0	4.68	0	0	5.85	0	0	7.02	0	0	8.19	0	0
42	0	0	4.91	0	0	6.14	0	0	7.37	0	0	8.60	0	0
43	0	0	5.15	0	0	6.44	0	0	7.73	0	1	0.02	0	0
44	0	0	5.39	0	0	6.74	0	0	8.09	0	1	0.44	0	0
45	0	0	5.64	0	0	7.05	0	0	8.46	0	1	0.87	0	0
46	0	0	5.89	0	0	7.36	0	0	8.83	0	1	1.30	0	0
47	0	0	6.15	0	0	7.69	0	1	0.23	0	1	1.77	0	0
48	0	0	6.42	0	0	8.02	0	1	0.62	0	1	2.22	0	0
49	0	0	6.69	0	0	8.37	0	1	1.05	0	1	2.71	0	0
50	0	0	6.96	0	0	8.70	0	1	1.44	0	1	3.18	0	0

A TABLE

A TABLE for finding the Content of the Crown of a Copper, $\frac{1}{2}$ the Altitude being one Inch, in Ale Barrells, Firkins, Gallons, &c.

I.D.	0		$\frac{1}{2}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B	F | G. P.	B	F | G. P.	B	F | G. P.	B	F | G. P.
31	0	0 2.68	0	0 3.55	0	0 4.02	0	0 4.69
32	0	0 2.85	0	0 3.56	0	0 4.27	0	0 4.98
33	0	0 3.03	0	0 3.79	0	0 4.55	0	0 5.31
34	0	0 3.22	0	0 4.03	0	0 4.84	0	0 5.64
35	0	0 3.41	0	0 4.26	0	0 5.11	0	0 5.96
36	0	0 3.61	0	0 4.51	0	0 5.41	0	0 6.31
37	0	0 3.81	0	0 4.76	0	0 5.71	0	0 6.66
38	0	0 4.02	0	0 5.02	0	0 6.03	0	0 7.03
39	0	0 4.24	0	0 5.30	0	0 6.36	0	0 7.41
40	0	0 4.47	0	0 5.58	0	0 6.70	0	0 7.82
41	0	0 4.68	0	0 5.85	0	0 7.02	I	0.19
42	0	0 4.91	0	0 6.14	0	0 7.37	I	0.66
43	0	0 5.15	0	0 6.44	0	0 7.73	I	1.02
44	0	0 5.39	0	0 6.74	0	I 0.09	I	1.44
45	0	0 5.64	0	0 7.05	0	I 0.46	I	1.87
46	0	0 5.89	0	0 7.36	0	I 0.83	I	2.30
47	0	0 6.15	0	0 7.69	0	I 1.23	I	2.77
48	0	0 6.42	0	I 0.02	0	I 1.62	I	3.22
49	0	0 6.69	0	I 0.37	0	I 2.05	I	3.71
50	0	0 6.96	0	I 0.70	0	I 2.44	I	4.18

A TABLE

A TABLE for finding the Content of the Crown of a Copper, $\frac{2}{3}$ the Altitude being one Inch, in Beer Barrels, Firkins, Gallons, &c.

I.D.	0.		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B|F|	G.P.	B|F|	G.P.	B|F|	G.P.	B|F|	G.P.
51	0 0	7.24	0 1	0.05	0 1	1.86	0 1	3.67
52	0 0	7.55	0 1	0.41	0 1	2.30	0 1	4.18
53	0 0	7.82	0 1	0.77	0 1	2.72	0 1	4.67
54	0 0	8.12	0 1	1.15	0 1	3.18	0 1	5.21
55	0 0	8.42	0 1	1.52	0 1	3.62	0 1	5.72
56	0 0	8.73	0 1	1.91	0 1	4.09	0 1	6.27
57	0 1	0.05	0 1	2.31	0 1	4.57	0 1	6.83
58	0 1	0.37	0 1	2.71	0 1	5.05	0 1	7.39
59	0 1	0.69	0 1	3.11	0 1	5.53	0 1	7.95
60	0 1	1.03	0 1	3.54	0 1	6.05	0 1	8.55
61	0 1	1.36	0 1	3.95	0 1	6.54	0 2	0.13
62	0 1	1.70	0 1	4.37	0 1	7.05	0 2	0.72
63	0 1	2.05	0 1	4.81	0 1	7.57	0 2	1.33
64	0 1	2.41	0 1	5.26	0 1	8.11	0 2	1.96
65	0 1	2.27	0 1	5.71	0 1	8.65	0 2	2.59
66	0 1	3.13	0 1	6.16	0 2	0.19	0 2	3.22
67	0 1	3.50	0 1	6.62	0 2	0.74	0 2	3.86
68	0 1	3.88	0 1	7.10	0 2	1.32	0 2	4.54
69	0 1	4.26	0 1	7.57	0 2	1.88	0 2	5.19
70	0 1	4.65	0 1	8.06	0 2	2.47	0 2	5.88

A TABLE

A TABLE for finding the Content of the
Crown of a Copper, $\frac{1}{2}$ the Altitude being
one Inch, in Beer Barrels, Firkins, Gallons,
&c.

0				$\frac{1}{2}$				$\frac{1}{2}$				$\frac{3}{4}$			
I.D.	B.	F.	G.P.	B.	F.	G.P.		B.	F.	G.P.		B.	F.	G.P.	
51	0	0	7.24	0	1	1.05	0	1	2.86	0	1	4.67			
52	0	0	7.55	0	1	1.41	0	1	3.39	0	1	5.18			
53	0	0	7.82	0	1	1.77	0	1	3.72	0	1	5.67			
54	0	1	0.12	0	1	2.15	0	1	4.18	0	1	6.21			
55	0	1	0.42	0	1	2.52	0	1	4.62	0	1	6.72			
56	0	1	0.73	0	1	29.1	0	1	5.09	0	1	7.27			
57	0	1	1.05	0	1	3.31	0	1	5.57	0	1	7.83			
58	0	1	1.37	0	1	3.71	0	1	6.05	0	2	0.39			
59	0	1	1.69	0	1	4.11	0	1	6.53	0	2	0.95			
60	0	1	2.03	0	1	4.54	0	1	7.05	0	2	1.55			
61	0	1	2.36	0	1	4.95	0	1	7.54	0	2	2.13			
62	0	1	2.70	0	1	5.37	0	2	0.05	0	2	2.72			
63	0	1	3.05	0	1	5.81	0	2	0.57	0	2	3.33			
64	0	1	3.41	0	1	6.26	0	2	1.11	0	2	3.96			
65	0	1	3.77	0	1	6.71	0	2	1.65	0	2	4.59			
66	0	1	4.13	0	1	7.16	0	2	2.19	0	2	5.22			
67	0	1	4.50	0	1	7.62	0	2	2.74	0	2	5.86			
68	0	1	4.88	0	2	0.10	0	2	3.32	0	2	6.54			
69	0	1	5.26	0	2	0.57	0	2	3.88	0	2	7.19			
70	0	1	5.65	0	2	1.06	0	2	4.47	0	2	7.88			

A TABLE for finding the Content of the Crown of a Copper, the Altitude being one Inch, in Beer Barrels, Firkins, Gallons, &c.

I.D.	0				.4				.2				0				.4			
	B	F	G	P	B	F	G	P	B	F	G	P	B	F	G	P	B	F	G	P
71	0	1	5.04	0	1	8.55	0	2	3.06	0	2	6.57	0	2	0.57					
72	0	1	5.44	0	2	0.05	0	2	3.66	0	2	0.27	0	2	0.27					
73	0	1	5.84	0	2	0.55	0	2	4.26	0	2	0.97	0	2	0.97					
74	0	1	6.25	0	2	1.06	0	2	4.88	0	2	1.69	0	2	1.69					
75	0	1	6.67	0	2	1.59	0	2	5.51	0	3	0.43	0	3	0.43					
76	0	1	7.09	0	2	2.11	0	2	6.13	0	3	1.15	0	3	1.15					
77	0	1	7.51	0	2	2.64	0	2	6.77	0	3	1.90	0	3	1.90					
78	0	1	7.94	0	2	3.17	0	2	7.41	0	3	2.64	0	3	2.64					
79	0	1	8.38	0	2	3.72	0	2	8.06	0	3	3.41	0	3	3.41					
80	0	1	8.82	0	2	4.27	0	2	8.73	0	3	4.18	0	3	4.18					
81	0	2	0.27	0	2	4.84	0	3	0.41	0	3	4.98	0	3	4.98					
82	0	2	0.73	0	2	5.41	0	3	1.09	0	3	5.77	0	3	5.77					
83	0	2	1.19	0	2	5.99	0	3	1.79	0	3	6.59	0	3	6.59					
84	0	2	1.65	0	2	6.56	0	3	2.47	0	3	7.38	0	3	7.38					
85	0	2	2.12	0	2	7.15	0	3	3.18	0	3	8.21	0	3	8.21					
86	0	2	2.60	0	2	7.75	0	3	3.90	1	0	0.05	1	0	0.05					
87	0	2	3.08	0	2	8.35	0	3	4.62	1	0	0.89	1	0	0.89					
88	0	2	3.57	0	2	8.96	0	3	5.35	1	0	1.74	1	0	1.74					
89	0	2	4.06	0	3	0.57	0	3	6.09	1	0	2.60	1	0	2.60					
90	0	2	4.56	0	3	1.20	0	3	6.84	1	0	3.48	1	0	3.48					

TABLE A

A TABLE

A TABLE for finding the Content of the
Crown of a Copper, $\frac{1}{4}$ the Altitude being
one Inch, in Ale Barrels, Firkins, Gallons,
&c.

ID	0		B	$\frac{1}{4}$		B	$\frac{1}{2}$		B	$\frac{3}{4}$	
	F	G.P.		F	G.P.		F	G.P.		F	G.P.
71	0	6.04	0	2	1.55	0	2	5.06	0	3	0.57
72	0	6.44	0	2	2.05	0	2	5.66	0	3	1.27
73	0	6.84	0	2	2.55	0	2	6.26	0	3	1.97
74	0	7.25	0	2	3.06	0	2	6.88	0	3	2.69
75	0	7.67	0	2	3.59	0	2	7.51	0	3	3.43
76	0	8.09	0	2	4.11	0	3	8.13	0	3	4.15
77	0	8.51	0	2	4.64	0	3	8.77	0	3	4.90
78	0	8.94	0	2	5.17	0	3	9.41	0	3	5.64
79	0	9.38	0	2	5.72	0	3	2.06	0	3	6.41
80	0	9.82	0	2	6.27	0	3	2.73	0	3	7.18
81	0	22.27	0	2	6.84	0	3	3.41	0	3	7.98
82	0	22.73	0	2	7.41	0	3	4.09	1	0	8.77
83	0	23.19	0	2	7.99	0	3	4.79	1	0	9.59
84	0	23.65	0	3	8.56	0	3	5.47	1	0	10.38
85	0	24.12	0	3	9.15	0	3	6.18	1	0	11.21
86	0	24.60	0	3	9.75	0	3	6.90	1	0	12.05
87	0	25.08	0	3	10.35	0	3	7.62	1	0	12.89
88	0	25.57	0	3	10.96	1	0	8.35	1	0	13.74
89	0	26.06	0	3	11.57	1	0	9.09	1	0	14.60
90	0	26.56	0	3	12.20	1	0	9.84	1	0	15.48

A TABLE for finding the Content of the Crown of a Copper, $\frac{1}{2}$ the Altitude being two Inches, in Beer Barrels, Firkins, Gallons, &c.

I.D.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
31	0	0	5.35	0	0	6.12	0	0	6.69	0	0	7.36
32	0	0	5.70	0	0	6.41	0	0	7.12	0	0	7.83
33	0	0	6.07	0	0	6.83	0	0	7.59	0	0	8.35
34	0	0	6.43	0	0	7.24	0	0	8.04	0	0	8.85
35	0	0	6.82	0	0	7.67	0	0	8.52	0	1	0.67
36	0	0	7.22	0	0	8.12	0	1	0.02	0	1	0.92
37	0	0	7.62	0	0	8.57	0	1	0.42	0	1	1.37
38	0	0	8.04	0	1	0.05	0	1	1.06	0	1	2.06
39	0	0	8.47	0	1	0.53	0	1	1.59	0	1	2.65
40	0	0	8.91	0	1	1.02	0	1	2.13	0	1	3.24
41	0	1	0.36	0	1	1.53	0	1	2.70	0	1	3.87
42	0	1	0.84	0	1	2.07	0	1	3.30	0	1	4.53
43	0	1	1.30	0	1	2.59	0	1	3.88	0	1	5.17
44	0	1	1.78	0	1	3.13	0	1	4.48	0	1	5.83
45	0	1	2.28	0	1	3.69	0	1	5.10	0	1	6.51
46	0	1	2.79	0	1	4.26	0	1	5.73	0	1	7.20
47	0	1	3.30	0	1	4.84	0	1	6.38	0	1	7.92
48	0	1	3.83	0	1	5.43	0	1	7.03	0	1	8.63
49	0	1	4.27	0	1	6.05	0	1	7.72	0	2	0.40
50	0	1	4.93	0	1	6.67	0	1	8.41	0	2	1.15

A TABLE

A TABLE for finding the Content of the Crown of a Copper, $\frac{1}{2}$ the Altitude being two Inches, in Ale Barrels, Firkins, Gallons, &c.

I.D.	0.		$\frac{1}{2}$		$\frac{1}{2}$		$\frac{3}{4}$	
	B	F|G.P.	B	F|G.P.	B	F|G.P.	B	F|G.P.
31	0	5.35	0	6.02	0	6.69	0	7.36
32	0	5.70	0	6.41	0	7.12	0	7.83
33	0	6.07	0	6.83	0	7.59	0	8.35
34	0	6.43	0	7.24	0	8.04	0	8.85
35	0	6.82	0	7.67	0	8.52	0	9.37
36	0	7.22	0	8.12	0	9.02	0	9.92
37	0	7.62	0	8.57	0	9.42	0	10.37
38	0	8.04	0	9.05	0	9.86	0	10.86
39	0	8.47	0	9.53	0	10.29	0	11.35
40	0	8.91	0	10.02	0	10.73	0	11.84
41	0	9.36	0	10.53	0	11.17	0	12.33
42	0	9.84	0	11.07	0	11.63	0	12.83
43	0	10.30	0	11.59	0	12.10	0	13.33
44	0	10.78	0	12.13	0	12.58	0	13.83
45	0	11.28	0	12.69	0	13.07	0	14.33
46	0	11.79	0	13.26	0	13.57	0	14.83
47	0	12.30	0	13.84	0	14.08	0	15.33
48	0	12.83	0	14.43	0	14.60	0	15.83
49	0	13.37	0	15.05	0	15.13	0	16.33
50	0	13.93	0	15.67	0	15.67	0	16.83

A TABLE for finding the Content of the Crown of a Copper, $\frac{1}{2}$ the Altitude being two Inches, in Beer Barrels Firkins, Gallons, &c.

I	D	0				$\frac{1}{4}$				$\frac{1}{2}$				$\frac{3}{4}$		
		B	F	G.P.		B	F	G.P.		B	F	G.P.		B	F	G.P.
51	0	1	5.49	0	1	7.30	0	2	0.11	0	2	1.92				
52	0	1	6.06	0	1	7.94	0	2	0.82	0	2	2.70				
53	0	1	6.65	0	1	8.60	0	2	1.55	0	2	3.50				
54	0	1	7.24	0	2	0.27	0	2	2.30	0	2	4.33				
55	0	1	7.85	0	2	0.95	0	2	3.05	0	2	5.15				
56	0	1	8.47	0	2	1.63	0	2	3.87	0	2	6.01				
57	0	2	0.09	0	2	2.35	0	2	4.61	0	2	6.87				
58	0	2	0.74	0	2	3.08	0	2	5.42	0	2	7.76				
59	0	2	1.39	0	2	3.83	0	2	6.25	0	2	8.67				
60	0	2	2.05	0	2	4.56	0	2	7.07	0	3	0.58				
61	0	2	2.73	0	2	5.32	0	2	7.91	0	3	1.50				
62	0	2	3.41	0	2	6.08	0	2	8.76	0	3	2.44				
63	0	2	4.11	0	2	6.87	0	3	0.63	0	3	3.39				
64	0	2	4.82	0	2	7.67	0	3	1.52	0	3	4.37				
65	0	2	5.53	0	2	8.47	0	3	2.41	0	3	5.47				
66	0	2	6.26	0	3	0.29	0	3	3.32	0	3	6.35				
67	0	2	7.00	0	3	1.13	0	3	4.26	0	3	7.39				
68	0	2	7.76	0	3	1.98	0	3	5.20	0	3	8.42				
69	0	2	8.52	0	3	2.83	0	3	6.15	1	0	0.46				
70	0	3	0.29	0	3	3.70	0	3	7.11	1	0	1.52				

A TABLE

A TABLE for finding the Content of the Crown of a Copper, the Altitude being two Inches, in Ale Barrels, Firkins, Gallons, &c.

0			$\frac{1}{2}$			$\frac{1}{2}$			$\frac{3}{4}$		
B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
51	0	1 6.49	0	2	0.30	0	2	2.11	0	2	3.92
52	0	1 7.06	0	2	0.94	0	2	2.82	0	2	4.70
53	0	1 7.65	0	2	1.60	0	2	3.55	0	2	5.50
54	0	2 0.24	0	2	2.27	0	2	4.30	0	2	6.33
55	0	2 0.85	0	2	2.95	0	2	5.05	0	2	7.15
56	0	2 1.47	0	2	3.63	0	2	5.87	0	3	0.01
57	0	2 2.09	0	2	4.35	0	2	6.61	0	3	0.87
58	0	2 2.74	0	2	5.08	0	2	7.42	0	3	1.76
59	0	2 3.39	0	2	5.83	0	3	0.25	0	3	2.67
60	0	2 4.05	0	2	6.56	0	3	1.07	0	3	3.58
61	0	2 4.73	0	2	7.32	0	3	1.91	0	3	4.50
62	0	2 5.41	0	3	0.08	0	3	2.76	0	3	5.44
63	0	2 6.11	0	3	0.87	0	3	3.63	0	3	6.39
64	0	2 6.82	0	3	1.67	0	3	4.52	0	3	7.37
65	0	2 7.53	0	3	2.47	0	3	5.41	0	3	0.37
66	0	3 0.26	0	3	3.29	0	3	6.32	1	0	1.35
67	0	3 1.00	0	3	4.13	0	3	7.26	1	0	2.39
68	0	3 1.76	0	3	4.98	1	0	0.20	1	0	3.42
69	0	3 2.52	0	3	5.83	1	0	1.15	1	0	4.46
70	0	3 3.29	0	3	6.70	1	0	2.11	1	0	5.52

A TABLE for finding the Content of the Crown of a Copper, $\frac{1}{2}$ the Altitude being two Inches, in Beer Barrels, Firkins, Gallons, &c.

I.D.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
71	0	3	1.07	0	3	4.58	0	3	8.09	1	0	2.60
72	0	3	1.88	0	3	5.49	1	0	0.10	1	0	3.71
73	0	3	2.68	0	3	6.39	1	0	1.10	1	0	4.81
74	0	3	3.50	0	3	7.32	1	0	2.13	1	0	5.95
75	0	3	4.33	0	3	8.25	1	0	3.17	1	0	7.09
76	0	3	5.17	1	0	0.19	1	0	4.21	1	0	8.23
77	0	3	6.03	1	0	1.16	1	0	5.29	1	1	0.42
78	0	3	6.89	1	0	2.12	1	0	6.36	1	1	1.60
79	0	3	7.76	1	0	3.10	1	0	7.45	1	1	2.80
80	0	3	8.65	1	0	4.10	1	0	8.56	1	1	4.02
81	1	0	0.55	1	0	5.12	1	1	0.69	1	1	5.26
82	1	0	1.45	1	0	6.13	1	1	1.81	1	1	6.49
83	1	0	2.37	1	0	7.17	1	1	2.97	1	1	7.77
84	1	0	3.30	1	0	8.21	1	1	4.12	1	2	0.03
85	1	0	4.24	1	1	0.27	1	1	5.30	1	2	1.33
86	1	0	5.20	1	1	1.35	1	1	6.50	1	2	2.65
87	1	0	6.16	1	1	2.43	1	1	7.70	1	2	3.97
88	1	0	7.14	1	1	3.53	1	1	8.92	1	2	5.31
89	1	0	8.12	1	1	4.63	1	2	1.15	1	2	6.67
90	1	1	0.11	1	1	5.75	1	2	2.39	1	2	8.03

A TABLE

A T A B L E for finding the Content of the Crown of a Copper, $\frac{1}{2}$ the Altitude being two Inches, in Ale Barrels, Firkins, Gallons, &c.

I.D	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
71	0	3	4.07	0	3	7.58	1	0	3.09	1	0	6.60
72	0	3	4.88	1	0	0.49	1	0	4.10	1	0	7.71
73	0	3	5.68	1	0	1.39	1	0	5.10	1	1	0.81
74	0	3	6.50	1	0	2.32	1	0	6.13	1	1	1.95
75	0	3	7.33	1	0	3.25	1	0	7.17	1	1	3.09
76	1	0	0.17	1	0	4.19	1	1	0.21	1	1	4.23
77	1	0	1.03	1	0	5.16	1	1	1.29	1	1	5.41
78	1	0	1.89	1	0	6.12	1	1	2.36	1	1	6.60
79	1	0	2.76	1	0	7.10	1	1	3.45	1	1	7.80
80	1	0	3.65	1	1	0.10	1	1	4.56	1	2	1.02
81	1	0	4.55	1	1	1.12	1	1	5.69	1	2	2.26
82	1	0	5.45	1	1	2.13	1	1	6.81	1	2	3.49
83	1	0	6.37	1	1	3.17	1	1	7.97	1	2	4.77
84	1	0	7.30	1	1	4.21	1	2	1.12	1	2	6.03
85	1	1	0.24	1	1	5.27	1	2	2.20	1	2	7.33
86	1	1	1.20	1	1	6.35	1	2	3.50	1	3	0.65
87	1	1	2.16	1	1	7.43	1	2	4.70	1	3	1.97
88	1	1	3.14	1	2	.53	1	2	5.92	1	3	3.31
89	1	1	4.12	1	2	1.63	1	2	7.15	1	3	4.67
90	1	1	5.11	1	2	2.75	1	3	0.39	1	3	6.03

A T A B L E

A TABLE for finding the Content of the
Crown of a Copper, the Altitude being
three Inches, in Beer Barrels, Firkins, Gallons,
&c.

	0	$\frac{1}{2}$	$\frac{1}{2}$	0	$\frac{1}{2}$
D.	B|F|G.P.	B|F|G.P.	B|F|G.P.	B|F|G.P.	B|F|G.P.
31	0|0|0.03	0|0|0.87	0|1|0.37	0|1|1.04	
32	0|0|8.55	0|1|0.26	0|1|0.97	0|1|1.68	
33	0|1|0.10	0|1|0.86	0|1|0.82	0|1|2.31	
34	0|1|0.65	0|1|1.45	0|1|2.26	0|1|3.06	
35	0|1|1.23	0|1|2.08	0|1|2.83	0|1|3.71	
36	0|1|1.83	0|1|2.73	0|1|3.63	0|1|4.35	
37	0|1|2.43	0|1|3.38	0|1|4.33	0|1|5.21	
38	0|1|3.06	0|1|4.07	0|1|5.07	0|1|6.06	
39	0|1|3.73	0|1|4.79	0|1|5.85	0|1|6.89	
40	0|1|4.37	0|1|5.50	0|1|6.83	0|1|8.16	
41	0|1|5.05	0|1|6.21	0|1|7.89	0|2|8.56	
42	0|1|5.75	0|1|6.98	0|1|8.31	0|2|0.54	
43	0|1|6.45	0|1|7.74	0|2|0.03	0|2|1.33	
44	0|1|7.18	0|1|8.53	0|2|1.08	0|2|2.14	
45	0|1|7.92	0|2|0.33	0|2|1.74	0|2|3.11	
46	0|1|8.68	0|2|1.15	0|2|2.62	0|2|4.09	
47	0|2|0.45	0|2|1.99	0|2|3.53	0|2|5.07	
48	0|2|1.25	0|2|2.85	0|2|4.45	0|2|6.01	
49	0|2|2.06	0|2|3.73	0|2|5.41	0|2|7.00	
50	0|2|2.89	0|2|4.63	0|2|6.37	0|2|8.11	

A TABLE for finding the Content of the Crown of a Copper, the Altitude being three Inches, in Ale Barrels, Firkins, Gallons, &c.

L.D.	B	F	G.	P.	B	F	G.P.	B	F	G.P.		
31	0	1	0.63	0	1	0.70	0	1	1.37	0	1	2.04
32	0	1	0.85	0	1	1.26	0	1	1.97	0	1	2.68
33	0	1	1.10	0	1	1.86	0	1	2.82	0	1	3.38
34	0	1	1.65	0	1	2.45	0	1	3.26	0	1	4.06
35	0	1	2.23	0	1	3.08	0	1	3.93	0	1	4.78
36	0	1	2.83	0	1	3.73	0	1	4.63	0	1	5.13
37	0	1	3.43	0	1	4.38	0	1	5.33	0	1	6.28
38	0	1	4.06	0	1	5.07	0	1	6.07	0	1	7.08
39	0	1	4.73	0	1	5.79	0	1	6.85	0	1	7.91
40	0	1	5.37	0	1	6.50	0	1	7.83	0	1	8.16
41	0	1	6.05	0	1	7.21	0	2	0.39	0	2	1.96
42	0	1	6.75	0	1	7.98	0	2	1.31	0	2	2.94
43	0	1	7.45	0	2	0.74	0	2	2.03	0	2	3.32
44	0	2	0.18	0	2	1.53	0	2	3.08	0	2	4.43
45	0	2	0.92	0	2	2.33	0	2	3.74	0	2	5.15
46	0	2	1.68	0	2	3.15	0	2	4.62	0	2	6.09
47	0	2	2.45	0	2	3.99	0	2	5.53	0	2	7.06
48	0	2	3.25	0	2	4.85	0	2	6.45	0	3	0.05
49	0	2	4.06	0	2	5.73	0	2	7.41	0	3	1.08
50	0	2	4.89	0	2	6.63	0	3	0.37	0	3	2.11

A TABLE

A TABLE for finding the Content of the
Crown of a Copper, $\frac{1}{2}$ the Altitude being
three Inches; in Beer Barrels, Firkins, Gallons
&c.

		0		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
I	D	B	F	G	P.	B	F	G	P.
51	0	2	3.73	0	2	5.54	0	2	7.35
52	0	2	4.59	0	2	6.47	0	2	8.35
53	0	2	5.47	0	2	7.42	0	3	0.37
54	0	2	6.36	0	2	8.39	0	3	1.42
55	0	2	7.27	0	3	0.37	0	3	2.47
56	0	2	8.20	0	3	1.38	0	3	3.56
57	0	3	0.15	0	3	2.41	0	3	4.67
58	0	3	1.11	0	3	3.45	0	3	5.79
59	0	3	2.08	0	3	4.50	0	3	6.92
60	0	3	3.08	0	3	5.59	0	3	8.10
61	0	3	4.09	0	3	6.68	1	0	0.23
62	0	3	5.12	0	3	7.79	1	0	1.47
63	0	3	6.16	0	3	8.92	1	0	2.68
64	0	3	7.22	1	0	1.07	1	0	3.92
65	0	3	8.30	1	0	2.24	1	0	5.18
66	1	0	0.40	1	0	3.43	1	0	6.46
67	1	0	1.51	1	0	4.63	1	0	7.76
68	1	0	2.64	1	0	5.86	1	1	0.08
69	1	0	3.78	1	0	7.08	1	1	1.40
70	1	0	4.94	1	0	8.35	1	1	2.76

A TABLE

A TABLE for finding the Content of the
Crown of a Copper; the Altitude being
three Inches, in Ale Barrels, Firkins, Gallons,
&c.

I.D.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
51	0	2	5.73	0	2	7.54	0	3	1.35	0	3	3.16
52	0	2	6.59	0	3	0.47	0	3	2.35	0	3	4.23
53	0	2	7.47	0	3	1.42	0	3	3.37	0	3	5.32
54	0	3	0.36	0	3	2.39	0	3	4.42	0	3	6.45
55	0	3	1.27	0	3	3.37	0	3	5.47	0	3	7.52
56	0	3	2.20	0	3	4.38	0	3	6.56	1	0	0.74
57	0	3	3.15	0	3	5.41	0	3	7.67	1	0	1.93
58	0	3	4.11	0	3	6.45	1	0	0.79	1	0	3.13
59	0	3	5.08	0	3	7.50	1	0	1.92	1	0	4.34
60	0	3	6.08	1	0	0.59	1	0	3.10	1	0	5.61
61	0	3	7.09	1	0	1.68	1	0	4.23	1	0	6.86
62	1	0	0.12	1	0	2.79	1	0	5.47	1	1	0.15
63	1	0	1.16	1	0	3.92	1	0	6.68	1	1	1.44
64	1	0	2.22	1	0	5.07	1	0	7.92	1	1	2.77
65	1	0	3.30	1	0	6.24	1	1	1.18	1	1	4.12
66	1	0	4.40	1	0	7.43	1	1	2.46	1	1	5.49
67	1	0	5.51	1	1	0.63	1	1	3.76	1	1	6.89
68	1	0	6.64	1	1	1.86	1	1	5.08	1	2	0.30
69	1	0	7.78	1	1	3.08	1	1	6.40	1	2	1.71
70	1	1	0.94	1	1	4.35	1	1	7.76	1	2	3.17

A TABLE

A TABLE for finding the Content of the Crown of a Copper, $\frac{1}{2}$ the Altitude being three Inches, in Beer Barrels, Firkins, Gallons, &c.

	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
P.	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
71	1	0	6.14	1	1	0.63	1	1	4.14	1	1	7.65
72	1	0	7.31	1	1	1.92	1	1	5.53	1	2	8.84
73	1	0	8.53	1	1	3.24	1	1	6.95	1	2	1.66
74	1	1	0.75	1	1	4.56	1	1	8.38	1	2	3.19
75	1	1	2.00	1	1	5.92	1	2	0.84	1	2	4.76
76	1	1	3.26	1	1	7.28	1	2	2.36	1	2	6.32
77	1	1	4.54	1	1	8.69	1	2	3.82	1	2	7.95
78	1	1	5.83	1	2	1.06	1	2	5.30	1	3	0.54
79	1	1	7.15	1	2	2.49	1	2	6.84	1	3	2.19
80	1	1	8.47	1	2	3.92	1	2	8.38	1	3	3.84
81	1	2	0.82	1	2	5.39	1	3	0.96	1	3	5.53
82	1	2	2.18	1	2	6.86	1	3	2.54	1	3	7.24
83	1	2	3.56	1	2	8.36	1	3	4.16	1	3	8.96
84	1	2	4.96	1	3	0.87	1	3	5.78	2	0	1.69
85	1	2	6.37	1	3	2.40	1	3	7.43	2	0	3.46
86	1	2	7.79	1	3	3.94	2	0	0.09	2	0	5.24
87	1	3	0.24	1	3	5.51	2	0	1.78	2	0	7.05
88	1	3	1.70	1	3	7.09	2	0	3.48	2	0	8.87
89	1	3	3.18	1	3	8.69	2	0	5.21	2	1	1.73
90	1	3	4.68	2	0	1.32	2	0	6.96	2	1	3.60

A TABLE

A TABLE for finding the Content of the Crown of a Copper, the Altitude being three Inches, in Ale Barrells, Firkins, Gallons, &c.

I.D	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
71	1	1	2.12	1	1	5.63	1	2	1.14	1	2	4.65
72	1	1	3.31	1	1	6.93	1	2	2.53	1	2	6.14
73	1	1	4.53	1	2	0.24	1	2	3.95	1	2	7.66
74	1	1	5.75	1	2	1.56	1	2	5.38	1	3	1.19
75	1	1	7.00	1	2	2.92	1	2	6.84	1	3	2.76
76	1	2	0.26	1	2	4.28	1	3	0.36	1	3	4.32
77	1	2	1.54	1	2	5.69	1	3	1.82	1	3	5.95
78	1	2	2.83	1	2	7.06	1	3	3.30	1	3	7.54
79	1	2	4.15	1	3	0.49	1	3	4.84	2	0	1.19
80	1	2	5.47	1	3	1.92	1	3	6.38	2	0	2.84
81	1	2	6.82	1	3	3.39	1	3	7.96	2	0	4.53
82	1	3	0.18	1	3	4.86	2	0	1.54	2	0	6.24
83	1	3	1.56	1	3	6.36	2	0	3.16	2	0	7.96
84	1	3	2.96	1	3	7.89	2	0	4.78	2	1	1.69
85	1	3	4.37	2	0	1.40	2	0	6.43	2	1	3.46
86	1	3	5.79	2	0	2.94	2	1	0.09	2	1	5.24
87	1	3	7.24	2	0	4.51	2	1	1.78	2	1	7.05
88	2	0	0.70	2	0	6.09	2	1	3.48	2	2	0.87
89	2	0	2.18	2	0	7.69	2	1	5.21	2	2	1.73
90	2	0	3.68	2	1	1.32	2	1	6.96	2	2	3.60

A TABLE

A TABLE for finding the Content of the Crown of a Copper, $\frac{1}{8}$ the Altitude being four Inches, in Beer Barrels, Firkins, Gallons, &c.

0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
I.D.	B|F	G.P.	B|F	G.P.	B|F	G.P.	B|F	G.P.			
50	0	3|0.85	0	3|1.59	0	3|3.33	0	3|5.97			
51	0	3|1.97	0	3|3.78	0	3|5.59	0	3|7.40			
52	0	3|3.12	0	3|5.00	0	3|6.88	0	3|8.76			
53	0	3|4.29	0	3|6.24	0	3|8.09	1	0|1.04			
54	0	3|5.84	0	3|7.51	1	0|0.53	1	0|2.55			
55	0	3|6.70	0	3|8.80	1	0|1.90	1	0|4.00			
56	0	3|7.93	1	0|1.11	1	0|3.29	1	0|5.47			
57	1	0|0.20	1	0|2.46	1	0|4.72	1	0|6.98			
58	1	0|1.48	1	0|3.82	1	0|6.16	1	0|8.50			
59	1	0|2.76	1	0|5.20	1	0|7.62	1	1|1.04			
60	1	0|4.10	1	0|6.60	1	1|0.11	1	1|2.63			
61	1	0|5.41	1	0|8.04	1	1|1.63	1	1|4.22			
62	1	0|6.82	1	1|0.49	1	1|3.17	1	1|5.85			
63	1	0|8.22	1	1|1.96	1	1|4.72	1	1|7.50			
64	1	1|0.61	1	1|3.50	1	1|6.35	1	2|0.20			
65	1	1|2.06	1	1|5.00	1	1|7.94	1	2|1.88			
66	1	1|3.53	1	1|6.56	1	2|0.59	1	2|3.62			
67	1	1|5.01	1	1|8.13	1	2|2.26	1	2|5.39			
68	1	1|6.51	1	2|0.73	1	2|3.95	1	2|7.17			
69	1	1|8.04	1	2|2.35	1	2|5.67	1	2|8.98			
70	1	2|0.59	1	2|4.00	1	2|7.41	1	3|1.82			

A TABLE

A TABLE for finding the Content of the Crown of a Copper, $\frac{1}{2}$ the Altitude being four Inches, in Ale Barrels, Firkins, Gallons, &c.

LD.	0			B	$\frac{1}{4}$			B	$\frac{1}{2}$			B	$\frac{3}{4}$		
	F	G.	P.		F	G.	P.		F	G.	P.		F	G.	P.
50	0	3	3.85	0	3	4.59	0	3	6.33	1	0	0.97			
51	0	3	4.97	0	3	6.78	1	0	0.59	1	0	2.40			
52	0	3	6.12	1	0	0.00	1	0	1.88	1	0	3.76			
53	0	3	7.29	1	0	1.24	1	0	3.09	1	0	5.04			
54	1	0	0.48	1	0	2.51	1	0	4.53	1	0	6.55			
55	1	0	1.70	1	0	3.80	1	0	5.99	1	1	0.00			
56	1	0	2.93	1	0	5.11	1	0	7.29	1	1	1.47			
57	1	0	4.20	1	0	6.46	1	1	0.72	1	1	2.98			
58	1	0	5.48	1	0	7.82	1	1	2.16	1	1	4.50			
59	1	0	6.76	1	1	1.20	1	1	3.62	1	1	6.04			
60	1	1	0.10	1	1	2.60	1	1	5.11	1	1	7.63			
61	1	1	1.41	1	1	4.04	1	1	6.63	1	2	1.22			
62	1	1	2.82	1	1	5.49	1	2	0.17	1	2	2.85			
63	1	1	4.22	1	1	6.96	1	2	1.72	1	2	4.50			
64	1	1	5.61	1	2	0.50	1	2	3.35	1	2	6.20			
65	1	1	7.06	1	2	2.00	1	2	4.94	1	2	7.88			
66	1	2	0.53	1	2	3.56	1	2	6.59	1	3	1.62			
67	1	2	2.01	1	2	5.13	1	3	0.26	1	3	3.39			
68	1	2	3.51	1	2	6.73	1	3	1.95	1	3	5.17			
69	1	2	5.04	1	3	8.35	1	3	3.67	1	3	6.98			
70	1	2	6.59	1	3	2.00	1	3	5.41	1	3	8.82			

A TABLE for finding the Content of the Crown of a Copper, $\frac{1}{2}$ the Altitude being four Inches, in Beer Barrels, Firkins, Gallons, &c.

I.D.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
71	1	2	2.16	1	2	5.67	1	3	0.18	1	3	3.69
72	1	2	3.75	1	2	7.36	1	3	1.97	1	3	5.58
73	1	2	5.37	1	3	0.08	1	3	3.79	1	3	7.50
74	1	2	7.00	1	3	1.81	1	3	5.63	2	0	0.44
75	1	2	8.66	1	3	3.58	1	3	7.50	2	0	2.42
76	1	3	1.34	1	3	5.36	2	0	0.38	2	0	4.40
77	1	3	3.05	1	3	7.18	2	0	2.31	2	0	6.44
78	1	3	4.78	2	0	0.01	2	0	4.25	2	0	8.40
79	1	3	6.53	2	0	1.87	2	0	6.22	2	1	1.57
80	1	3	8.30	2	0	3.75	2	0	8.21	2	1	3.67
81	2	0	1.09	2	0	5.66	2	1	1.23	2	1	5.80
82	2	0	2.90	2	0	7.58	2	1	3.26	2	1	7.94
83	2	0	4.77	2	1	0.55	2	1	5.35	2	2	1.15
84	2	0	6.61	2	1	2.52	2	1	7.43	2	2	3.34
85	2	0	8.49	2	1	4.52	2	2	0.55	2	2	5.54
86	2	1	1.39	2	1	6.54	2	2	2.69	2	2	7.84
87	2	1	3.32	2	1	8.59	2	2	4.86	2	3	1.14
88	2	1	5.27	2	2	1.66	2	2	7.05	2	3	3.44
89	2	1	7.24	2	2	3.75	2	3	0.27	2	3	5.74
90	2	2	0.24	2	2	5.88	2	3	2.52	2	3	8.14

A TABLE

A TABLE for finding the Content of the Crown of a Copper, $\frac{1}{2}$ the Altitude being four Inches, in Ale Barrels, Firkins, Gallons, &c.

LD.	0			$\frac{1}{2}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G. P.	B	F	G. P.	B	F	G. P.	B	F	G. P.
71	1	3	0.16	1	3	3.67	1	3	7.18	2	0	2.69
72	1	3	1.75	1	3	5.36	2	0	0.97	2	0	4.58
73	1	3	3.37	1	3	7.08	2	0	2.79	2	0	6.50
74	1	3	5.00	2	0	0.81	2	0	4.63	2	1	0.44
75	1	3	6.66	2	0	2.58	2	0	6.90	2	1	2.42
76	2	0	0.34	2	0	4.36	2	1	0.38	2	1	4.40
77	2	0	2.05	2	0	6.18	2	1	2.31	2	1	6.44
78	2	0	3.78	2	1	0.01	2	1	4.25	2	2	0.40
79	2	0	5.53	2	1	1.87	2	1	6.22	2	2	2.75
80	2	0	7.30	2	1	3.75	2	2	0.21	2	2	4.67
81	2	1	1.09	2	1	5.66	2	2	2.23	2	2	6.80
82	2	1	2.90	2	1	7.48	2	2	4.26	2	3	0.94
83	2	1	4.77	2	2	1.55	2	2	6.35	2	3	3.15
84	2	1	6.61	2	2	3.52	2	3	0.43	0	3	5.34
85	2	2	0.49	2	2	5.52	2	3	2.55	0	3	7.58
86	2	2	2.39	2	2	7.54	2	3	4.69	3	0	1.84
87	2	2	4.32	2	3	1.59	2	3	6.86	3	0	4.13
88	2	2	6.27	2	3	3.66	3	0	1.05	3	0	6.44
89	2	8	0.24	2	3	5.75	3	0	3.27	3	1	0.79
90	2	3	2.24	2	3	7.88	3	0	5.52	3	1	3.16

A TABLE for finding the Content of the Crown of a Copper, $\frac{1}{4}$ the Altitude being four Inches, in Beer Barrels, Firkins, Gallons, &c.

	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
L.D.	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
91	2	2	2.24	2	2	8.00	2	3	4.77	3	0	1.54
92	2	2	4.28	2	3	1.17	2	3	7.06	3	0	3.95
93	2	2	6.35	2	3	3.37	3	0	0.39	3	0	6.41
94	2	2	8.44	2	3	5.59	3	0	2.74	3	0	8.89
95	2	3	0.54	2	3	7.82	3	0	5.10	3	1	2.38
96	2	3	3.69	3	0	1.09	3	0	7.51	3	1	4.93
97	2	3	5.80	3	0	3.35	3	1	0.90	3	1	7.45
98	2	3	7.99	3	0	5.68	3	1	3.37	3	2	1.06
99	3	0	1.19	3	0	8.01	3	1	5.84	3	2	3.67
100	3	0	3.40	3	1	1.36	3	1	8.32	3	2	6.28
101	3	0	5.64	3	1	3.74	3	2	1.84	3	2	8.94
102	3	0	7.90	3	1	6.14	3	2	4.39	3	3	2.64
103	3	1	1.19	3	1	8.58	3	2	6.97	3	3	5.36
104	3	1	3.49	3	2	2.02	3	3	0.55	3	3	8.08
105	3	1	5.82	3	2	4.50	3	3	3.18	4	0	1.86
106	3	1	8.17	3	2	6.99	3	3	5.81	4	0	4.63
107	3	2	1.55	3	3	0.52	3	3	8.49	4	0	7.46
108	3	2	3.94	3	3	3.06	4	4	2.18	4	1	1.30
109	3	2	6.36	3	3	5.63	4	0	4.90	4	1	4.17
110	3	2	8.80	3	3	8.22	4	0	7.65	4	1	7.08

A TABLE

A TABLE for finding the Content of the Crown of a Copper, $\frac{1}{2}$ the Altitude being four Inches, in Ale Barrels, Firkins, Gallons, &c.

I.D.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
91	2	3	4.24	3	0	2.00	3	0	7.77	3	1	5.54
92	2	3	6.28	3	0	4.17	3	1	2.06	3	1	7.95
93	3	0	0.35	3	0	6.37	3	1	4.39	3	2	2.41
94	3	0	2.44	3	1	0.59	3	1	6.74	3	2	4.89
95	3	0	4.54	3	1	2.82	3	2	1.10	3	2	7.38
96	3	0	6.79	3	1	5.09	3	2	3.51	3	3	1.93
97	3	1	0.80	3	1	7.35	3	2	5.90	3	3	4.45
98	3	1	2.99	3	2	1.68	3	3	0.37	3	3	7.06
99	3	1	5.01	3	2	4.01	3	3	2.84	4	0	1.67
100	3	1	7.40	3	2	6.26	3	3	5.32	4	0	4.28
101	3	2	1.64	3	3	0.74	3	3	7.84	4	0	5.94
102	3	2	3.90	3	3	3.14	4	0	2.39	4	1	1.64
103	3	2	6.19	3	3	5.58	4	0	4.97	4	1	4.36
104	3	3	0.49	4	0	0.02	4	0	7.55	4	1	7.08
105	3	3	2.82	4	0	2.50	4	1	2.18	4	2	1.86
106	3	3	5.17	4	0	4.99	4	1	4.81	4	2	4.63
107	3	3	7.55	4	0	7.52	4	1	7.49	4	2	7.46
108	4	0	1.94	4	1	2.06	4	2	2.18	4	3	2.30
109	4	0	4.36	4	1	4.63	4	2	4.90	4	3	5.17
110	4	0	6.80	4	1	7.22	4	2	7.65	5	0	0.08

A TABLE for finding the Content of the Crown of a Copper, $\frac{1}{2}$ the Altitude being five Inches, in Beer Barrels, Firkins, Gallons, &c.

	0		$\frac{1}{2}$		$\frac{1}{2}$		$\frac{1}{2}$					
I.D.	B	F|G.P.	B	F|G.P.	B	F|G.P.	B	F|G.P.				
50	0	3	7.81	1	0	0.55	1	0	2.22	1	0	3.96
51	1	0	0.22	1	0	2.03	1	0	3.93	1	0	5.81
52	1	0	1.65	1	0	3.53	1	0	5.41	1	0	7.29
53	1	0	3.11	1	0	5.06	1	0	7.01	1	0	8.96
54	1	0	4.61	1	0	6.64	1	0	8.66	1	1	1.69
55	1	0	6.12	1	0	8.22	1	1	1.32	1	1	3.42
56	1	0	7.67	1	1	0.85	1	1	3.03	1	1	5.21
57	1	1	0.24	1	1	2.51	1	1	4.76	1	1	7.04
58	1	1	1.85	1	1	4.19	1	1	6.53	1	1	8.87
59	1	1	3.47	1	1	5.99	1	1	8.41	1	2	1.83
60	1	1	5.13	1	1	7.65	1	2	1.14	1	2	3.65
61	1	1	6.82	1	2	0.41	1	2	3.00	1	2	5.59
62	1	1	8.53	1	2	2.20	1	2	4.88	1	2	7.56
63	1	2	1.27	1	2	4.03	1	2	6.79	1	3	0.55
64	1	2	3.04	1	2	5.89	1	2	8.74	1	3	2.59
65	1	2	4.83	1	2	7.77	1	3	1.71	1	3	4.65
66	1	2	6.66	1	3	0.69	1	3	3.72	1	3	6.75
67	1	2	8.51	1	3	2.63	1	3	5.76	1	3	8.89
68	1	3	1.39	1	3	4.61	1	3	7.83	2	0	2.05
69	1	3	3.30	1	3	6.61	2	0	0.93	2	0	4.24
70	1	3	5.24	1	3	8.65	2	0	3.06	2	0	6.47

A TABLE

A TABLE for finding the Content of the Crown of a Copper, $\frac{1}{2}$ the Altitude being five Inches, in Ale Barrels, Firkins, Gallons, &c.

	0		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
I.D.	B	F|G.P.	B	F|G.P.	B	F|G.P.	B	F|G.P.
50	1 0	2.81	1 0	4.55	1 0	6.22	1 0	7.96
51	1 0	4.22	1 0	6.03	1 0	7.93	1 1	1.81
52	1 0	5.65	1 0	7.53	1 1	1.41	1 1	3.29
53	1 0	7.11	1 1	1.06	1 1	3.01	1 1	4.96
54	1 1	0.61	1 1	2.64	1 1	4.66	1 1	6.69
55	1 1	2.12	1 1	4.22	1 1	6.32	1 2	0.42
56	1 1	3.67	1 1	5.85	1 2	0.93	1 2	2.21
57	1 1	5.24	1 1	7.51	1 2	1.76	1 2	4.04
58	1 1	6.85	1 2	1.19	1 2	3.53	1 2	5.87
59	1 2	0.47	1 2	2.99	1 2	5.41	1 2	7.83
60	1 2	2.13	1 2	4.65	1 2	7.14	1 3	1.65
61	1 2	3.82	1 2	6.41	1 3	1.00	1 3	3.59
62	1 2	5.53	1 3	0.20	1 3	2.88	1 3	5.56
63	1 2	7.27	1 3	2.03	1 3	4.79	1 3	7.55
64	1 3	1.04	1 3	3.89	1 3	6.74	2 0	1.59
65	1 3	2.83	1 3	5.77	2 0	0.71	2 0	2.65
66	1 3	4.66	1 3	7.69	2 0	2.72	2 0	5.75
67	1 3	6.51	2 0	1.63	2 0	4.76	2 0	7.89
68	2 0	0.39	2 0	3.61	2 0	6.83	2 1	2.05
69	2 0	2.30	2 0	5.61	2 1	0.93	2 1	4.24
70	2 0	4.24	2 0	7.65	2 1	3.06	2 1	6.47

A TABLE for finding the Content of the Crown of a Copper, $\frac{1}{2}$ the Altitude being five Inches, in Beer Barrels, Firkins, Gallons, &c.

I.D.	0				$\frac{1}{2}$				$\frac{3}{4}$				$\frac{3}{4}$			
	B	F	G.	P.	B	F	G.	P.	B	F	G.	P.	B	F	G.	P.
71	1	3	7.19	2 0	1.70	2	0	5.21	2	0	8.72					
72	2	0	0.19	2 0	3.80	2	0	7.41	2	1	2.02					
73	2	0	2.21	2 0	5.92	2	1	0.63	2	1	4.54					
74	2	0	4.26	2 0	8.07	2	1	2.89	2	1	6.70					
75	2	0	6.33	2 1	1.25	2	1	5.17	2	2	0.09					
76	2	0	8.43	2 1	3.45	2	1	7.47	2	2	2.49					
77	2	1	1.56	2 1	5.69	2	2	0.82	2	2	4.95					
78	2	1	3.72	2 1	7.95	2	2	3.19	2	2	7.43					
79	2	1	5.91	2 2	1.25	2	2	5.60	2	3	0.95					
80	2	1	8.12	2 2	3.57	2	2	8.03	2	3	3.49					
81	2	2	1.36	2 2	5.93	2	3	1.50	2	3	6.02					
82	2	2	3.63	2 2	8.31	2	3	4.00	2	3	8.67					
83	2	2	5.93	2 3	1.73	2	3	6.55	3	0	2.33					
84	2	2	8.26	2 3	4.17	3	0	0.08	3	0	4.99					
85	2	3	1.61	2 3	6.64	3	0	2.67	3	0	7.70					
86	2	3	3.99	3 0	0.14	3	0	5.29	3	1	1.44					
87	2	3	6.40	3 0	2.67	3	0	7.94	3	1	4.21					
88	2	3	8.84	3 0	5.23	3	1	1.62	3	1	7.01					
89	3	0	2.30	3 0	7.81	3	1	4.33	3	2	0.85					
90	3	0	4.80	3 1	1.44	3	1	7.08	3	2	3.72					

A TABLE

A TABLE for finding the Content of the Crown of a Copper, $\frac{1}{2}$ the Altitude being five Inches; in Ale Barrels, Firkins, Gallons, &c.

0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
I.D	B	F|G. P.	B|F	G.P.	B|F	G.P.	B|F	G.P.	B|F	G.P.	
71	2	0 6.19	2	1 1.70	2	1 5.21	2	2 0.72			
72	2	1 0.19	2	1 3.80	2	1 7.41	2	2 3.02			
73	2	1 2.21	2	1 5.92	2	2 1.63	2	2 5.54			
74	2	1 4.26	2	2 0.07	2	2 3.89	2	2 7.70			
75	2	1 6.33	2	2 2.25	2	2 6.17	2	3 2.09			
76	2	2 0.43	2	2 4.45	2	3 0.47	2	3 4.49			
77	2	2 2.56	2	2 6.69	2	3 2.82	2	3 6.95			
78	2	2 4.72	2	3 0.95	2	3 5.19	3	0 1.43			
79	2	2 6.91	2	3 3.25	2	3 7.60	3	0 3.95			
80	2	3 1.12	2	3 5.57	3	0 2.03	3	0 6.49			
81	2	3 3.36	2	3 7.93	3	0 4.50	3	1 1.07			
82	2	3 5.63	3	0 2.31	3	0 7.00	3	1 3.67			
83	2	3 7.93	3	0 4.73	3	1 1.55	3	1 6.33			
84	3	0 2.26	3	0 7.17	3	1 4.08	3	2 0.99			
85	3	0 4.61	3	1 1.64	3	1 6.67	3	2 3.70			
86	3	0 6.99	3	1 4.14	3	2 1.29	3	2 6.44			
87	3	1 1.40	3	1 6.67	3	2 3.94	3	3 1.21			
88	3	1 3.84	3	2 1.23	3	2 6.62	3	3 4.01			
89	3	1 6.30	3	2 3.81	3	3 1.33	3	3 6.85			
90	3	2 0.80	3	2 6.44	3	3 4.08	4	0 1.72			

A TABLE

A TABLE for finding the Content of the Crown of a Copper, $\frac{1}{2}$ the Altitude being five Inches, in Beer Barrels, Firkins, Gallons, &c.

	0		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
I.D.	B|F|	G.P.	B|F|	G.P.	B|F|	G.P.	B|F|	G.P.
91	3|0|	7.32	3|1|	4.06	3|2|	0.85	3|2|	6.62
92	3|1|	0.86	3|1|	6.75	3|2|	3.64	3|3|	0.53
93	3|1|	3.44	3|2|	0.46	3|2|	6.48	3|3|	3.50
94	3|1|	6.05	3|2|	3.20	3|3|	0.35	3|3|	6.50
95	3|1|	8.68	3|2|	5.96	3|3|	3.24	4|0|	0.52
96	3|2|	2.34	3|2|	8.76	3|3|	6.18	4|0|	3.60
97	3|2|	5.02	3|3|	2.57	4|0|	0.12	4|0|	6.67
98	3|2|	7.74	3|3|	5.43	4|0|	3.12	4|1|	0.81
99	3|3|	1.48	3|3|	8.30	4|0|	6.13	4|1|	3.96
100	3|3|	4.25	4|0|	2.21	4|1|	0.17	4|1|	7.13
101	3|3|	7.05	4|0|	5.15	4|1|	3.25	4|2|	1.35
102	4|0|	0.88	4|0|	8.12	4|1|	6.37	4|2|	4.62
103	4|0|	3.74	4|1|	2.13	4|2|	0.52	4|2|	7.91
104	4|0|	6.62	4|1|	5.15	4|2|	3.68	4|3|	2.21
105	4|1|	0.53	4|1|	8.21	4|2|	6.89	4|3|	5.57
106	4|1|	3.47	4|2|	2.29	4|3|	1.11	4|3|	8.93
107	4|1|	6.43	4|2|	5.40	4|3|	4.37	5|0|	3.34
108	4|2|	0.43	4|2|	8.55	4|3|	7.67	5|0|	6.79
109	4|2|	3.45	4|3|	2.72	5|0|	1.99	5|1|	1.27
110	4|2|	6.50	4|3|	5.92	5|0|	5.35	5|1|	4.78

A TABLE

A TABLE for finding the Content of the Crown of a Copper, $\frac{1}{4}$ the Altitude being five Inches, in Ale Barrels, Firkins, Gallons, &c.

	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
I.D.	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
91	3	2	3.32	3	3	1.06	3	3	6.85	4	0	4.62
92	3	2	5.86	3	3	3.75	4	0	1.64	4	0	7.53
93	3	3	0.44	3	3	6.46	4	0	4.48	4	1	2.50
94	3	3	3.05	4	0	1.20	4	0	7.35	4	1	5.50
95	3	3	5.68	4	0	3.96	4	1	2.24	4	2	0.52
96	4	0	0.34	4	0	6.76	4	1	5.18	4	2	3.60
97	4	0	3.02	4	1	1.57	4	2	0.12	4	2	6.67
98	4	0	5.74	4	1	4.43	4	2	3.12	4	3	1.81
99	4	1	0.48	4	1	7.30	4	2	6.13	4	3	4.96
100	4	1	3.25	4	2	3.21	4	3	1.17	5	0	0.13
101	4	1	6.05	4	2	6.15	4	3	4.25	5	0	3.35
102	4	2	0.88	4	3	1.12	4	3	7.37	5	0	6.62
103	4	2	3.74	4	3	4.13	5	0	2.52	5	1	1.91
104	4	2	6.62	4	3	7.15	5	0	5.68	5	1	5.21
105	4	3	1.53	5	0	1.21	5	1	0.89	5	2	0.57
106	4	3	4.47	5	0	4.29	5	1	4.11	5	2	3.93
107	4	3	7.43	5	0	7.40	5	1	7.37	5	2	7.34
108	5	0	2.43	5	1	2.55	5	2	2.67	5	3	2.79
109	5	0	5.45	5	1	5.62	5	2	5.99	5	3	6.27
110	5	1	0.50	5	2	0.92	5	3	1.35	6	0	1.78

A TABLE

A TABLE for finding the Content of the Crown of a Copper, $\frac{1}{2}$ the Altitude being six Inches, in Beer Barrels, Firkins, Gallons, &c.

ID.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
61	1	2	8.18	1	3	1.77	1	3	4.36	1	3	6.95
62	1	3	1.24	1	3	3.91	1	3	6.59	2	0	0.27
63	1	3	3.32	1	3	6.08	1	3	8.84	2	0	2.40
64	1	3	5.45	1	3	8.30	2	0	2.15	2	0	5.00
65	1	3	7.60	2	0	1.54	2	0	4.48	2	0	7.42
66	2	0	0.79	2	0	3.82	2	0	6.85	2	1	0.88
67	2	0	3.01	2	0	6.13	2	1	0.26	2	1	3.39
68	2	0	5.26	2	0	8.48	2	1	2.70	2	1	5.92
69	2	0	7.56	2	1	1.87	2	1	5.19	2	1	8.40
70	2	1	0.88	2	1	4.29	2	1	7.70	2	2	2.11
71	2	1	3.24	2	1	6.75	2	2	1.26	2	2	4.77
72	2	1	5.64	2	2	0.23	2	2	3.84	2	2	7.45
73	2	1	8.05	2	2	2.76	2	2	6.47	2	3	1.18
74	2	2	1.51	2	2	5.32	2	3	0.14	2	3	3.95
75	2	2	4.00	2	2	7.92	2	3	2.84	2	3	6.76
76	2	2	6.53	2	3	1.54	2	3	5.56	3	0	0.56
77	2	3	0.07	2	3	4.20	2	3	8.33	3	0	3.46
78	2	3	2.66	2	3	6.89	3	0	2.13	3	0	6.37
79	2	3	5.29	3	0	0.63	3	0	4.98	3	1	0.33
80	2	3	7.94	3	0	3.39	3	0	7.85	3	1	3.31

A TABLE

A TABLE for finding the Content of the
Crown of a Copper, the Altitude being
fix Inches, in Ale Barrels, Firkins, Gallons,
c.c.

ID.	0		$\frac{1}{2}$		$\frac{1}{2}$		$\frac{3}{2}$	
	B	F	G	P.	B	F	G	P.
61	1	3	6.18	2	0	0.77	2	0
62	2	0	0.24	2	0	2.91	2	0
63	2	0	2.32	2	0	5.08	2	0
64	2	0	4.45	2	0	7.30	2	1
65	2	0	6.60	2	1	9.54	2	1
66	2	1	0.79	2	1	3.82	2	1
67	2	1	3.01	2	1	6.13	2	2
68	2	1	5.26	2	2	0.48	2	2
69	2	1	7.56	2	2	2.87	2	2
70	2	2	1.88	2	2	5.29	2	3
71	2	2	4.24	2	2	7.75	2	3
72	2	2	6.62	2	3	2.23	2	3
73	2	3	1.05	2	3	4.76	3	0
74	2	3	3.51	2	3	7.32	3	0
75	2	3	6.00	2	0	1.92	3	0
76	3	0	0.52	3	0	4.54	3	1
77	3	0	3.07	3	0	7.20	3	1
78	3	0	5.66	3	1	1.89	3	1
79	3	1	0.29	3	1	4.63	3	2
80	3	1	2.94	3	1	7.39	3	2

A TABLE

A TABLE for finding the Content of the Crown of a Copper, $\frac{1}{2}$ the Altitude being six Inches, in Beer Barrels, Firkins, Gallons, &c.

I.D.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
81	3	0	1.63	3	0	6.20	3	1	1.77	3	1	6.34
82	3	0	4.36	3	1	0.04	3	1	4.72	3	2	0.40
83	3	0	7.11	3	1	2.91	3	1	7.71	3	2	3.51
84	3	1	0.91	3	1	5.82	3	2	1.73	3	2	6.64
85	3	1	3.73	3	1	8.76	3	2	4.79	3	3	0.82
86	3	1	6.59	3	2	1.74	3	2	7.89	3	3	4.04
87	3	2	0.48	3	2	5.74	3	3	2.00	3	3	7.26
88	3	2	3.40	3	2	8.80	3	3	5.18	4	0	1.57
89	3	2	6.36	3	3	2.87	3	3	8.39	4	0	5.91
90	3	3	0.35	3	3	6.00	4	0	2.63	4	0	8.27
91	3	3	3.38	4	0	0.14	4	0	5.91	4	1	2.68
92	3	3	6.43	4	0	3.32	4	1	0.21	4	1	6.10
93	4	0	0.53	4	0	6.55	4	1	3.57	4	2	0.59
94	4	0	3.65	4	1	0.75	4	1	6.90	4	2	4.05
95	4	0	6.81	4	1	4.09	4	2	1.37	4	2	7.67
96	4	1	1.00	4	1	7.42	4	2	4.84	4	3	2.26
97	4	1	4.23	4	2	1.78	4	2	8.33	4	3	5.88
98	4	1	7.48	4	2	5.17	4	3	2.86	5	0	0.55
99	4	2	1.78	4	2	8.60	4	3	6.43	5	0	4.26
100	4	2	5.11	4	3	3.07	5	0	1.03	5	0	7.99

A TABLE

A TABLE for finding the Content of the Crown of a Copper, $\frac{1}{2}$ the Altitude being six Inches, in Ale Barrels, Firkins, Gallons, &c.

I.D.	0		$\frac{1}{2}$		$\frac{1}{2}$		$\frac{3}{4}$					
	B.F	G.P.	B.F	G.P.	B.F	G.P.	B.F	G.P.				
81	3	1	5.63	3	2	2.20	3	2	6.77	3	3	3.34
82	3	2	0.36	3	2	5.04	3	3	1.72	3	3	6.40
83	3	2	3.11	3	2	7.91	3	3	4.71	4	0	1.51
84	3	2	5.91	3	3	2.82	3	3	7.73	4	0	4.64
85	3	3	0.73	3	3	5.76	4	0	2.79	4	0	7.82
86	3	3	3.59	4	0	0.74	4	0	5.89	4	1	3.04
87	3	3	6.48	4	0	3.74	4	1	1.00	4	1	6.26
88	4	0	1.40	4	0	6.80	4	1	4.18	4	2	1.57
89	4	0	4.36	4	1	1.87	4	2	7.39	4	2	5.91
90	4	0	7.35	4	1	5.00	4	2	2.63	4	3	0.27
91	4	1	2.38	4	2	0.00	4	2	5.91	4	3	3.68
92	4	1	5.43	4	2	3.32	4	3	1.21	4	3	7.10
93	4	2	0.53	4	2	6.55	4	3	4.57	5	0	2.59
94	4	2	3.65	4	3	1.75	4	3	7.90	5	0	6.05
95	4	2	6.81	4	3	5.09	5	0	3.37	5	1	1.67
96	4	3	2.00	5	0	0.42	5	0	6.84	5	1	5.26
97	4	3	5.23	5	0	3.78	5	1	2.33	5	2	0.88
98	5	0	0.48	5	0	7.17	5	1	5.86	5	2	4.55
99	5	0	3.78	5	1	2.60	5	2	1.43	5	3	0.26
100	5	0	7.11	5	1	5.07	5	2	5.03	5	3	3.99

A TABLE

A TABLE for finding the Content of the
Crown of a Copper, $\frac{1}{2}$ the Altitude being
six Inches, in Beer Barrels, Firkins, Gallons,
&c.

	0					$\frac{1}{2}$					$\frac{1}{2}$					$\frac{3}{4}$					
	I	D	B	F	G.P.	B	F	G.P.		B	F	G.P.		B	F	G.P.		B	F	G.P.	
101	4	2			8.46	4	3			5	0			4.66	5	1			2.76		
102	4	3			2.85	5	0			5	0			8.34	5	1			6.49		
103	4	3			6.28	5	0			5	1			3.06	5	2			1.45		
104	5	0			0.74	5	0			5	1			6.80	5	2			5.33		
105	5	0			4.24	5	1			5	2			1.60	5	3			0.28		
106	5	0			7.96	5	1			5	2			5.50	5	3			4.32		
107	5	1			2.32	5	2			5	3			0.26	5	3			8.23		
108	5	1			5.91	5	2			5	3			4.15	6	0			3.27		
109	5	2			0.54	5	2			5	3			8.08	6	0			7.35		
110	5	2			4.20	5	3			6	0			3.05	6	1			2.48		
111	5	2			7.89	5	3			6	0			7.05	6	1			6.65		
112	5	3			2.62	6	0			6	1			2.09	6	2			1.81		
113	5	3			6.38	6	0			6	1			6.16	6	2			6.05		
114	6	0			1.17	6	1			6	2			1.27	6	3			1.32		
115	6	0			5.00	6	1			6	2			5.42	6	3			5.63		
116	6	0			8.86	6	2			6	3			0.64	7	0			1.03		
117	6	1			3.75	6	2			6	3			4.81	7	0			5.35		
118	6	1			7.68	6	2			7	0			0.07	7	1			0.76		
119	6	2			2.64	6	3			7	0			4.36	7	1			5.22		
120	6	2			6.63	6	3			7	0			8.68	7	2			0.71		

A TABLE

A TABLE for finding the Content of the Crown of a Copper, $\frac{1}{2}$ the Altitude being six Inches, in Ale Barrels, Firkins, Gallons, &c.

I.D.	0			$\frac{1}{4}$			$\frac{1}{2}$			$\frac{3}{4}$		
	B	F	G.P.	B	F	G.P.	B	F	G.P.	B	F	G.P.
101	5	1	2.46	5	2	1.56	5	3	0.66		3	7.76
102	5	1	5.85	5	2	5.09	5	3	4.34		0	3.49
103	5	2	1.28	5	3	0.67	6	0	0.06	6	0	7.45
104	5	2	4.74	5	3	4.27	6	0	3.80	6	1	3.33
105	5	3	0.24	5	3	7.92	6	0	7.60		1	7.28
106	5	3	3.76	6	0	3.58	6	1	3.50	6	2	3.32
107	5	3	7.32	6	0	7.29	6	1	7.26	6	2	7.23
108	6	0	2.91	6	1	3.03	6	2	3.15	6	3	3.27
109	6	0	6.54	6	1	6.81	6	2	7.08	6	3	7.35
110	6	1	2.20	6	2	2.62	6	3	3.05	7	0	3.48
111	6	1	5.89	6	2	6.47	6	3	7.05	7	0	7.65
112	6	2	1.62	6	3	2.35	7	0	3.09	7	1	3.81
113	6	2	5.36	6	3	6.27	7	0	7.16	7	2	0.05
114	6		1.17	7	0	2.22	7	1	3.27	7	2	4.32
115	6	3	5.00	7	0	6.21	7	1	7.42	7	3	0.63
116	7	0	0.86	7	1	2.25	7	2	3.64	7	3	5.03
117	7	0	4.75	7	1	6.28	7	2	7.81	8	0	1.35
118	7	1	0.68	7	2	2.37	7	3	4.07	8	0	5.76
119	7	1	4.64	7	2	6.50	8	0	0.36	8	1	2.22
120	7	2	0.63	7	3	2.65	8	0	4.68	8	1	6.71

A Table converting Decimal parts of a Beer Barrel into Gallons and Pintes, and the *Converse*.

		Decim.parts.			Decim.parts.
Pintes.	1	0.0034722	16	0.4444445	
	2	0.0069444	17	0.4722223	
	3	0.0104166	18	0.5000000	
	4	0.0138889	19	0.5277778	
	5	0.0173611	20	0.5555556	
	6	0.0208333	21	0.5833334	
	7	0.0243055	22	0.6111112	
Gallons.	1	0.0277778	23	0.6388890	
	2	0.0555556	24	0.6666667	
	3	0.0833334	25	0.6944445	
	4	0.1111112	26	0.7222223	
	5	0.1388890	27	0.7500000	
	6	0.1666667	28	0.7777778	
	7	0.1944445	29	0.8055556	
	8	0.2222223	30	0.8333334	
	9	0.2500000	31	0.8611112	
	10	0.2777778	32	0.8888890	
	11	0.3055556	33	0.9166667	
	12	0.3333334	34	0.9444445	
	13	0.3611112	35	0.9722223	
	14	0.3888890	36	1.0000000	
	15	0.4166667			

A Table

A Table converting Decimal parts of an Ale Barrel into Gallons and Pintes, and the *Converse*.

		Decim.parts.			Decim.parts.
Pintes.	1	0.0039062	Gallons.	14	0.4375000
	2	0.0078125		15	0.4687500
	3	0.0117187		16	0.5000000
	4	0.0156250		17	0.5312500
	5	0.0195312		18	0.5625000
	6	0.0234374		19	0.5937500
	7	0.0273437		20	0.6250000
Gallons.	1	0.0312500	21	0.6562500	
	2	0.0625000	22	0.6875000	
	3	0.0937500	23	0.7187500	
	4	0.1250000	24	0.7500000	
	5	0.1562500	25	0.7812500	
	6	0.1875000	26	0.8125000	
	7	0.2187500	27	0.8437500	
	8	0.2500000	28	0.8750000	
	9	0.2812500	29	0.9062500	
	10	0.3125000	30	0.9375000	
	11	0.3437500	31	0.9687500	
	12	0.3750000	32	1.0000000	
	13	0.4062500			

A Table for the Reduction of Gallons into Barrels, Firkins and Gallons, either of Beer or Ale.

Beer.				Ale.			
Gal.	B. F. Gal.			Gal.	B. F. Gal.		
10	00	01	01	10	00	01	02
11	00	01	02	11	00	01	03
12	00	01	03	12	00	01	04
13	00	01	04	13	00	01	05
14	00	01	05	14	00	01	06
15	00	01	06	15	00	01	07
16	00	01	07	16	00	02	00
17	00	01	08	17	00	02	01
18	00	02	00	18	00	02	02
19	00	02	01	19	00	02	03
20	00	02	02	20	00	02	04
21	00	02	03	21	00	02	05
22	00	02	04	22	00	02	06
23	00	02	05	23	00	02	07
24	00	02	06	24	00	03	00
25	00	02	07	25	00	03	01
26	00	02	08	26	00	03	02
27	00	03	00	27	00	03	03
28	00	03	01	28	00	03	04
29	00	03	02	29	00	03	05
30	00	03	03	30	00	03	06

A Table

A Table for the Reduction of Gallons into
Barrels, Firkins and Gallons, either of Beer
or Ale.

Beer.				Ale.			
Gal.	B.	F.	G.	Gal.	B.	F.	G.
31	00	03	04	31	00	03	07
32	00	03	05	32	01	00	00
33	00	03	06	33	01	00	01
34	00	03	07	34	01	00	02
35	00	03	08	35	01	00	03
36	01	00	00	36	01	00	04
37	01	00	01	37	01	00	05
38	01	00	02	38	01	00	06
39	01	00	03	39	01	00	07
40	01	00	04	40	01	01	00
41	01	00	05	41	01	01	01
42	01	00	06	42	01	01	02
43	01	00	07	43	01	01	03
44	01	00	08	44	01	01	04
45	01	01	00	45	01	01	05
46	01	01	01	46	01	01	06
47	01	01	02	47	01	01	07
48	01	01	03	48	01	02	00
49	01	01	04	49	01	02	01
50	01	01	05	50	01	02	02
60	01	02	06	60	01	03	04
70	01	03	07	70	02	00	06

A Table for the Reduction of Gallons into Barrels, Firkins and Gallons, either of Beer or Ale.

Beer.				Ale.			
Gal.	B.	F.	G.	Gal.	B.	F.	G.
80	02	00	08	80	02	02	00
90	02	02	00	90	02	03	02
100	02	03	01	100	03	00	04
200	05	02	02	200	06	01	00
300	08	01	03	300	09	01	04
400	11	00	04	400	12	02	00
500	13	03	05	500	15	02	04
600	16	02	06	600	18	03	00
700	19	01	07	700	21	03	04
800	22	00	08	800	25	00	00
900	25	00	00	900	28	00	04
1000	27	03	01	1000	31	01	00
2000	55	02	02	2000	62	02	00
3000	83	01	03	3000	93	03	00

A Table

A TABLE of REDUCTION of Barrels of Beer, into Barrels of Ale.

Ba. | B. | F. | G.				Ba. | B. | F. | G.				Ba. | B. | F. | G.			
1	01	0	4	21	23	2	4	41	46	0	4
2	02	1	0	22	24	3	0	42	47	1	0
3	03	1	4	23	25	3	4	43	48	1	4
4	04	2	0	24	27	0	0	44	49	2	0
5	05	2	4	25	28	0	4	45	50	2	4
6	06	3	0	26	29	1	0	46	51	3	0
7	07	3	4	27	30	1	4	47	52	3	4
8	09	0	0	28	31	2	0	48	54	0	0
9	10	0	4	29	32	2	4	49	55	0	4
10	11	1	0	30	33	3	0	50	56	1	0
11	12	1	4	31	34	3	4	51	57	1	4
12	13	2	0	32	36	0	0	52	58	2	0
13	14	2	4	33	37	0	4	53	59	2	4
14	15	3	0	34	38	1	0	54	60	3	0
15	16	3	4	35	39	1	4	55	61	3	4
16	18	0	0	36	40	2	0	56	63	0	0
17	19	0	4	37	41	2	4	57	64	0	4
18	20	1	0	38	42	3	0	58	65	1	0
19	21	1	4	39	43	3	4	59	66	1	4
20	22	2	0	40	45	0	0	60	67	2	0

A TABLE of REDUCTION of Barrels of Beer into Barrels of Ale.

Ba. | B. | F. | G.				Ba. | B. | F. | G.				Ba. | B. | F. | G.			
61	68	2	4	79	88	3	0	97	109	0	4
62	69	3	0	80	90	0	4	98	110	1	0
63	70	3	4	81	91	0	0	99	111	1	0
64	72	0	0	82	92	1	4	100	112	2	0
65	73	0	4	83	93	1	0	110	123	3	0
66	74	1	0	84	94	2	4	120	135	0	0
67	75	1	4	85	95	2	0	130	146	1	0
68	76	2	0	86	96	3	4	140	157	2	0
69	77	2	4	87	97	3	0	150	168	3	0
70	78	3	0	88	99	0	4				
71	79	3	4	89	100	0	0				
72	81	0	0	90	101	1	4				
73	82	0	4	91	102	1	0				
74	83	1	0	92	103	2	4				
75	84	1	4	93	104	2	0				
76	85	2	0	94	105	3	4				
77	86	2	4	95	106	3	0				
78	87	3	0	96	108	0	4				

Fir. | B. | F. | G.			
1	0	1	1
2	0	2	2
3	0	3	3
4	1	0	4

A TABLE

A TABLE of REDUCTION of Barrels of Ale into Barrels of Beer.

B.a.	B.	F.	G.	B.a.	B.	F.	G.	B.a.	B.	F.	G.
1	0	3	5	21	18	2	6	41	36	1	7
2	1	3	1	22	19	2	2	42	37	1	3
3	2	2	6	23	20	1	7	43	38	0	8
4	3	2	2	24	21	1	3	44	39	0	4
5	4	1	7	25	22	0	8	45	40	0	0
6	5	1	3	26	23	0	4	46	40	3	5
7	6	0	8	27	24	0	0	47	41	3	1
8	7	0	4	28	24	3	5	48	42	2	6
9	8	0	0	29	25	3	1	49	43	2	2
10	8	3	5	30	26	2	6	50	44	1	7
11	9	3	1	31	27	2	2	51	45	1	3
12	10	2	6	32	28	1	7	52	46	0	8
13	11	2	2	33	29	1	3	53	47	0	4
14	12	1	7	34	30	0	8	54	48	0	0
15	13	1	3	35	31	0	4	55	48	3	5
16	14	0	8	36	32	0	0	56	49	3	1
17	15	0	4	37	32	3	5	57	50	2	6
18	16	0	0	38	33	3	1	58	51	2	2
19	16	3	5	39	34	2	6	59	52	1	7
20	17	3	1	40	35	2	2	60	53	1	3

A TABLE

A TABLE of REDUCTION of Barrels of Ale into Barrels of Beer.

Ba. | B. | F. | G.	Ba. | B. | F. | G.	Ba. | B. | F. | G.
61 | 54 | 0 | 8	79 | 70 | 0 | 8	97 | 86 | 0 | 8
62 | 55 | 0 | 4	80 | 71 | 0 | 4	98 | 87 | 0 | 4
63 | 56 | 0 | 0	81 | 72 | 0 | 0	99 | 88 | 0 | 0
64 | 56 | 3 | 5	82 | 72 | 3 | 5	100 | 88 | 3 | 5
65 | 57 | 3 | 1	83 | 73 | 3 | 1	110 | 97 | 3 | 1
66 | 58 | 2 | 6	84 | 74 | 2 | 6	120 | 106 | 2 | 6
67 | 59 | 2 | 2	85 | 75 | 2 | 2	130 | 115 | 2 | 2
68 | 60 | 1 | 7	86 | 76 | 1 | 7	140 | 124 | 1 | 7
69 | 61 | 1 | 3	87 | 77 | 1 | 3	150 | 133 | 1 | 3
70 | 62 | 0 | 8	88 | 78 | 0 | 8	
71 | 63 | 0 | 4	89 | 79 | 0 | 4	
72 | 64 | 0 | 0	90 | 80 | 0 | 0	
73 | 64 | 3 | 5	91 | 80 | 4 | 5	
74 | 65 | 3 | 1	92 | 81 | 3 | 1	Fir. | B. | F. | G.
75 | 66 | 2 | 6	93 | 82 | 2 | 6	1 | 0 | 0 | 8
76 | 67 | 2 | 2	94 | 83 | 2 | 2	2 | 0 | 1 | 7
77 | 68 | 1 | 7	95 | 84 | 1 | 7	3 | 0 | 2 | 6
78 | 69 | 1 | 3	96 | 85 | 1 | 3	4 | 0 | 3 | 5

A TABLE

A Table of Allowances of three in every* 23 Barrels of Small Beer; and what Excise is usually paid, the said Allowances being deducted.

Gross Barrels.	Allowance Bar. Firk.		lb.	s.	d. q.
1	0	.0	0	00	9.0
2	0	.0	0	01	6.0
3	0	.1	0	02	0.3
4	0	.2	0	02	7.2
5	0	.2	0	03	4.2
6	0	.3	0	03	11.1
7	0	.3	0	04	8.1
8	1	.0	0	05	3.0
9	1	.0	0	06	0.0
10	1	.1	0	06	6.3
11	1	.1	0	07	3.3
12	1	.2	0	07	10.2
13	1	.2	0	08	7.2
14	1	.3	0	09	2.1
15	1	.3	0	09	11.1
16	2	.0	0	10	6.0
17	2	.0	0	11	3.0
18	2	.1	0	11	9.3
19	2	.1	0	12	6.3
20	2	.2	0	13	1.2

A Table

A Table of Allowances of three in every 23 Barrels of Small Beer; and what Excise is usually paid, the said Allowances being deducted.

Gros Barrels.	Allowances Bar. Firk.	lb.	s.	d. q.
21	2 .2	0	13	10.2
22	3 .3	0	14	5.1
23	3 .0	0	15	0.0
24	3 .0	0	15	9.0
25	3 .1	0	16	3.3
26	3 .1	0	17	0.3
27	3 .2	0	17	7.2
28	3 .2	0	18	4.2
29	3 .3	0	18	11.1
30	3 .3	0	19	8.1
31	4 .0	1	00	3.0
32	4 .0	1	01	0.0
33	4 .1	1	01	6.3
34	4 .1	1	02	3.3
35	4 .2	1	02	10.2
36	4 .2	1	03	7.2
37	4 .3	1	04	2.1
38	4 .3	1	04	11.1
39	5 .0	1	05	6.0
40	5 .0	1	06	3.0

A Table

A Table of Allowances of three in every 23 Barrels of Small Beer; and what Excise is usually paid, the said Allowances being deducted.

Grois Barrels.	Allowances Bar. Firk.	lb.	s.	d. q.
41	5 . 1	1	06	9.3
42	5 . 1	1	07	6.3
43	5 . 2	1	08	1.2
44	5 . 2	1	08	10.2
45	5 . 3	1	09	5 1
46	6 . 0	1	10	0.0
47	6 . 0	1	10	9.0
48	6 . 1	1	11	3.3
49	6 . 1	1	12	0.3
50	6 . 2	1	12	7.2
51	6 . 2	1	13	4.2
52	6 . 3	1	13	11.2
53	6 . 3	1	14	8.1
54	7 . 0	1	15	3.0
55	7 . 0	1	16	0.0
56	7 . 1	1	16	6.3
57	7 . 1	1	17	3.3
58	7 . 2	1	17	10.2
59	7 . 2	1	18	7.2
60	7 . 3	1	19	2.1

A Table

A Table of Allowances of three in every 23 Barrels of Small Beer; and what Excise is usually paid, the said Allowances being deducted.

Gross Barrels.	Allowances Bar. Firk.	lb.	s.	d. q.
61	7 . 3	1	19	11.1
62	8 . 0	2	00	6.0
63	8 . 0	2	01	3.0
64	8 . 1	2	01	9.3
65	8 . 1	2	02	6.3
66	8 . 2	2	03	1.2
67	8 . 2	2	03	10.2
68	8 . 3	2	04	5.1
69	9 . 0	2	05	0.0
70	9 . 0	2	05	9.0
71	9 . 1	2	06	3.3
72	9 . 1	2	07	0.3
73	9 . 2	2	07	7.2
74	9 . 2	2	08	4.2
75	9 . 3	2	08	11.1
76	9 . 3	2	09	8.1
77	10 . 0	2	10	3.0
78	10 . 0	2	11	0.0
79	10 . 1	2	11	6.3
80	10 . 1	2	12	3.3

A Table

A Table of Allowances of three in every 23 Barrels of Small Beer; and what Excise is usually paid, the said Allowances being deducted.

Gross Barrels.	Allowances Bar. Firk.	lb.	s.	d. q.
81	10 . 2	2	12	10.2
82	10 . 2	2	13	7.2
83	10 . 3	2	14	2.1
84	10 . 3	2	14	11.1
85	11 . 0	2	15	6.0
86	11 . 0	2	16	3.0
87	11 . 1	2	16	9.3
88	11 . 1	2	17	6.3
89	11 . 2	2	18	1.2
90	11 . 2	2	18	10.2
91	11 . 3	2	19	5.1
92	12 . 0	3	00	0.0
93	12 . 0	3	00	9.0
94	12 . 1	3	01	3.3
95	12 . 1	3	02	0.3
96	12 . 2	3	02	7.2
97	12 . 2	3	03	4.2
98	12 . 3	3	03	11.1
99	12 . 3	3	04	8.1
100	12 . 0	3	05	3.0

A Table

A Table of Allowances of three in every 23 Barrels of Small Beer; and what Excise is usually paid, the said Allowances being deducted.

Gross Barrels.	Allowance. Bar. Firk.	lb.	s.	d. q.
200	26 . 0	6	10	6.0
300	39 . 0	9	15	9.0
400	52 . 0	13	01	0.0
500	65 . 0	16	06	3.0
600	78 . 1	19	11	3.3
700	91 . 1	22	16	6.3
800	104 . 1	26	01	9.3
900	117 . 1	29	07	0.3
1000	130 . 1	32	12	3.3
2000	260 . 3	65	04	5.1
3000	301 . 1	97	16	6.3
4000	521 . 3	130	08	8.1
5000	652 . 0	163	01	0.0
6000	782 . 3	195	12	11.1
7000	913 . 0	228	05	3.0
8000	1043 . 1	260	17	6.3
9000	1173 . 1	293	10	0.3
10000	1304 . 1	326	04	9.3

A TABLE

A Table of Allowances of three in every 23 Barrels of Strong Beer; and what Excise is usually paid, the said Allowances being deducted.

Gros Barrels.	Allowance Bar. Firk.	lb.	s.	d. q.
1	0 . 0	0	03	03.0
2	0 . 0	0	06	06.0
3	0 . 1	0	08	11.1
4	0 . 2	0	11	04.2
5	0 . 2	0	14	07.2
6	0 . 3	0	17	00.3
7	0 . 3	1	00	03.3
8	1 . 0	1	02	09.0
9	1 . 0	1	06	00.0
10	1 . 1	1	08	05.1
11	1 . 1	1	11	08.1
12	1 . 2	1	14	01.2
13	1 . 2	1	17	04.2
14	1 . 3	1	19	09.3
15	1 . 3	2	03	00.3
16	2 . 0	2	05	06.0
17	2 . 0	2	08	09.0
18	2 . 1	2	11	02.1
19	2 . 1	2	14	05.1
20	2 . 2	2	16	10.2

A Table of Allowances of three in every 23 Barrels of Strong Beer, and what Excise is usually paid, the said Allowances being deducted.

Gross Barrels.	Allowances Bar. Firk.	lb.	s.	d. q.
21	2 . 2	3	00	01.2
22	2 . 3	3	02	06.3
23	3 . 0	3	05	00.0
24	3 . 0	3	08	03.0
25	3 . 1	3	10	08.1
26	3 . 1	3	13	11.1
27	3 . 2	3	16	04.2
28	3 . 2	3	19	07.2
29	3 . 3	4	02	00.3
30	3 . 3	4	05	03.3
31	4 . 0	4	07	09.0
32	4 . 0	4	11	00.0
33	4 . 1	4	13	05.1
34	4 . 1	4	16	08.1
35	4 . 2	4	19	01.2
36	4 . 1	5	02	04.2
37	4 . 3	5	04	09.3
38	4 . 3	5	08	00.3
39	5 . 0	5	10	06.0
40	5 . 0	5	13	09.0

A Table

A Table of Allowances of three in every 23 Barrels of Strong Beer; and what Excise is usually paid, the said Allowances being deducted.

Grois Barrels.	Allowances Bar. Firk.	lb.	s.	d. q.
41	5 . 1	5	16	02.1
42	5 . 1	5	19	05.1
43	5 . 2	6	01	10.2
44	5 . 2	6	05	01.2
45	5 . 3	6	07	06.3
46	6 . 0	6	10	00.0
47	6 . 0	6	13	03.0
48	6 . 1	6	15	08.3
49	6 . 1	6	18	11.1
50	6 . 2	7	01	04.2
51	6 . 2	7	04	07.2
52	6 . 3	7	07	00.3
53	6 . 3	7	10	03.3
54	7 . 0	7	12	09.0
55	7 . 0	7	16	00.0
56	7 . 1	7	18	05.1
57	7 . 1	8	01	08.1
58	7 . 2	8	04	01.2
59	7 . 2	8	07	04.2
60	7 . 3	8	09	09.3

A Table of Allowances of three in every 23 Barrels of Strong Beer ; and what Excise is usually paid, the said Allowances being deducted.

Gross Barrels.	Allowances Bar. Firk.	lb.	s.	d. q.
61	7 . 3	8	13	00.3
62	8 . 0	8	15	06.0
63	8 . 0	8	18	09.0
64	8 . 1	9	01	02.1
65	8 . 1	9	04	05.1
66	8 . 2	9	06	10.2
67	8 . 2	9	10	01.2
68	8 . 3	9	12	06.3
69	9 . 0	9	15	00.0
70	9 . 0	9	18	03.0
71	9 . 1	10	00	08.1
72	9 . 2	10	03	11.1
73	9 . 2	10	06	04.2
74	9 . 2	10	09	07.2
75	9 . 3	10	12	00.3
76	9 . 3	10	15	03.3
77	10 . 0	10	17	09.0
78	10 . 0	11	01	00.0
79	10 . 1	11	03	05.1
80	10 . 1	11	06	08.1

A Table

A Table of Allowances of three in every 23 Barrels of Strong Beer; and what Excise is usually paid, the said Allowances being deducted.

Gross Barrels.	Allowances Bar. Firk.	£.	s.	d. q.
81	10 . 2	11	09	01.2
82	10 . 2	11	12	04.2
83	10 . 3	11	14	09.3
84	10 . 3	11	18	00.3
85	11 . 0	12	00	06.0
86	11 . 0	12	03	09.0
87	11 . 1	12	06	02.1
88	11 . 1	12	09	05.1
89	11 . 2	12	11	10.2
90	11 . 2	12	15	01.2
91	11 . 3	12	17	06.3
92	12 . 0	13	00	00.0
93	12 . 0	13	03	03.0
94	12 . 1	13	05	08.1
95	12 . 1	13	08	11.1
96	12 . 2	13	11	04.2
97	12 . 2	13	14	07.2
98	12 . 3	13	17	00.3
99	12 . 3	14	00	03.3
100	13 . 0	14	02	09.0

X 3

A Table

A Table of Allowances of three in every 23 Barrels of Strong Beer; and what Excise is usually paid, the said Allowances being deducted.

Gross Barrels.	Allowances Bar. Firk.	£b.	s.	d. q.
200	26 . 0	28	05	06.0
300	39 . 0	42	08	03.0
400	52 . 0	56	11	00.0
500	65 . 0	70	13	09.0
600	78 . 1	84	15	08.1
700	91 . 1	98	18	05.1
800	104 . 1	112	01	02.1
900	117 . 1	127	03	11.1
1000	130 . 1	141	06	08.1
2000	260 . 3	282	12	06.3
3000	391 . 1	423	18	05.1
4000	520 . 3	565	04	06.3
5000	652 . 0	706	11	00.0
6000	782 . 3	847	16	00.3
7000	913 . 0	989	02	09.0
8000	1043 . 1	1130	09	03.1
9000	1173 . 1	1271	16	09.1
10000	1394 . 1	1413	01	02.1

A Table

A Table of Allowances of two in every 22 Barrels of Strong Ale; and what Excise is usually paid, the said Allowances being deducted.

Gross Barrels.	Allowance Bar. Firk.	lb.	s.	d. q.
1	0 . 0	0	03	00.0
2	0 . 0	0	06	06.0
3	0 . 1	0	08	11.1
4	0 . 1	0	12	02.1
5	0 . 1	0	15	05.1
6	0 . 2	0	17	10.2
7	0 . 2	1	01	01.2
8	0 . 2	1	04	04.2
9	0 . 3	1	06	09.3
10	0 . 3	1	10	00.3
11	1 . 0	1	12	06.0
12	1 . 0	1	15	09.0
13	1 . 0	1	19	00.0
14	1 . 1	2	01	05.1
15	1 . 1	2	04	08.1
16	1 . 1	2	07	11.1
17	1 . 2	2	10	04.2
18	1 . 2	2	13	07.2
19	1 . 2	2	16	01.2
20	1 . 3	2	19	03.3

X 4

A Table

A Table of Allowances of two in every 22 Barrels of Strong Ale, and what Excise is usually paid, the said Allowances being deducted.

Gros Barrels.	Allowances Bar. Firk.	lb.	s.	d. q.
21	1 . 3	3	02	06.3
22	2 . 0	3	05	00.0
23	2 . 0	3	08	03.0
24	2 . 0	3	11	06.0
25	2 . 1	3	13	11.1
26	2 . 1	3	17	02.1
27	2 . 1	4	00	05.1
28	2 . 2	4	02	10.2
29	2 . 2	4	06	01.2
30	2 . 2	4	09	04.2
31	2 . 3	4	11	09.3
32	2 . 3	4	15	00.3
33	3 . 0	4	17	06.0
34	3 . 0	5	00	09.0
35	3 . 0	5	04	00.0
36	3 . 1	5	06	05.1
37	3 . 1	5	09	08.1
38	3 . 1	5	12	11.1
39	3 . 2	5	15	04.2
40	3 . 2	5	18	07.2

A Table

A Table of Allowances of two in every 22 Barrels of Strong Ale; and what Excise is usually paid, the said Allowances being deducted.

Gross Barrels.	Allowances Bar. Firk.	lb.	s.	d. q.
41	3 . 2	6	01	10.2
42	3 . 3	6	04	03.3
43	3 . 3	6	07	06.3
44	4 . 0	6	10	00.0
45	4 . 0	6	13	03.0
46	4 . 0	6	16	06.0
47	4 . 1	6	18	11.1
48	4 . 1	7	02	02.1
49	4 . 1	7	05	05.1
50	4 . 2	7	07	10.2
51	4 . 2	7	11	01.2
52	4 . 2	7	14	04.2
53	4 . 3	7	16	09.3
54	4 . 3	8	00	00.3
55	5 . 0	8	20	06.0
56	5 . 0	8	05	09.0
57	5 . 0	8	08	09.0
58	5 . 1	8	11	05.1
59	5 . 1	8	14	08.1
60	5 . 1	8	17	11.1

A Table

A Table of Allowances of two in every 22 Barrels of Strong Ale; and what Excise is usually paid, the said Allowances being deducted.

Gross Barrels.	Allowances Bar. Firk.	lb.	s.	d. q.
61	5 . 2	9	00	04.2
62	5 . 2	9	03	07.2
63	5 . 2	9	06	10.2
64	5 . 3	9	09	03.3
65	5 . 3	9	12	06.3
66	6 . 0	9	15	00.0
67	6 . 0	9	18	03.0
68	6 . 0	10	01	06.0
69	6 . 1	10	03	11.1
70	6 . 1	10	07	02.1
71	6 . 1	10	10	05.1
72	6 . 2	10	12	10.2
73	6 . 2	10	16	01.2
74	6 . 2	10	19	04.2
75	6 . 3	11	01	09.3
76	6 . 3	11	05	00.3
77	7 . 0	11	07	06.0
78	7 . 0	11	10	09.0
79	7 . 0	11	14	00.0
80	7 . 1	11	16	05.1

A Table

A Table of Allowances of two in every 22 Barrels of Strong Ale; and what Excise is usually paid, the said Allowances being deducted.

Gross Barrels.	Allowances Bar. Firk.	£.	s.	d. q.
81	7 . 1	11	19	08.1
82	7 . 1	12	02	11.1
83	7 . 2	12	05	04.2
84	7 . 2	12	08	07.2
85	7 . 2	12	11	10.2
86	7 . 3	12	14	03.3
87	7 . 3	12	17	06.3
88	8 . 0	13	00	00.0
89	8 . 0	13	03	03.0
90	8 . 0	13	06	06.0
91	8 . 1	13	08	11.1
92	8 . 1	13	12	02.1
93	8 . 1	13	15	05.1
94	8 . 2	13	17	10.2
95	8 . 2	14	01	01.2
96	8 . 2	14	04	04.2
97	8 . 3	14	06	09.3
98	8 . 3	14	10	00.3
99	9 . 0	14	12	06.0
100	9 . 0	14	15	09.0

A Table

A Table of Allowances of two in every 22 Barrels of Strong Ale; and what Excise is usually paid, the said Allowances being deducted.

Gross Barrels.	Allowances Bar. Firk.	lb.	s.	d. q.
200	18 . 0	29	11	06.0
300	27 . 1	44	06	05.1
400	36 . 1	59	02	02.1
500	45 . 1	73	17	11.1
600	54 . 2	88	12	10.2
700	63 . 2	103	08	07.2
800	72 . 2	118	04	04.2
900	81 . 3	123	19	03.3
1000	90 . 3	147	15	00.3
2000	181 . 3	295	09	03.3
3000	272 . 2	443	04	04.2
4000	363 . 2	590	18	07.2
5000	454 . 2	738	12	10.2
6000	545 . 1	886	07	11.1
7000	636 . 1	1034	02	02.1
8000	727 . 1	1181	16	05.1
9000	818 . 0	1329	11	06.0
10000	909 . 0	1477	05	09.0

A Table

A Table which by the Diameter of any Mash-Tun, shews the Content upon an Inch in Bushels, Gallons, and one hundred parts.

Inches of Diam.	Bush.	Gal. and parts.	Inches of Diam.	Bush.	Gal. and parts.
1	0	0 .00	21	0	1 .54
2	0	0 .01	22	0	1 .69
3	0	0 .03	23	0	1 .84
4	0	0 .05	24	0	2 .00
5	0	0 .09	25	0	2 .17
6	0	0 .13	26	0	2 .35
7	0	0 .17	27	0	2 .54
8	0	0 .22	28	0	2 .74
9	0	0 .28	29	0	2 .94
10	0	0 .35	30	0	3 .14
11	0	0 .42	31	0	3 .35
12	0	0 .50	32	0	3 .57
13	0	0 .59	33	0	3 .80
14	0	0 .68	34	0	4 .03
15	0	0 .78	35	0	4 .26
16	0	0 .89	36	0	4 .51
17	0	1 .00	37	0	4 .76
18	0	1 .12	38	0	5 .02
19	0	1 .25	39	0	5 .29
20	0	1 .39	40	0	5 .58

A Table

A Table which by the Diameter of any Mass
Tun, shews the Content upon an Inch in
Bushels, Gallons, and one hundred parts.

Inches of Diam.	Bush.	Gal. and parts.	Inches of Diam.	Bush.	Gal. and parts.
41	0	5 .87	61	1	4 .95
42	0	6 .16	62	1	5 .39
43	0	6 .45	63	1	5 .81
44	0	6 .75	64	1	6 .26
45	0	7 .05	65	1	6 .71
46	0	7 .36	66	1	7 .15
47	0	7 .68	67	1	7 .62
48	1	0 .01	68	2	0 .10
49	1	0 .35	69	2	0 .57
50	1	0 .70	70	2	1 .06
51	1	1 .05	71	2	1 .55
52	1	1 .41	72	2	2 .05
53	1	1 .78	73	2	2 .55
54	1	2 .15	74	2	3 .06
55	1	2 .54	75	2	3 .59
56	1	2 .91	76	2	4 .11
57	1	3 .30	77	2	4 .65
58	1	3 .71	78	2	5 .19
59	1	4 .11	79	2	5 .74
60	1	4 .51	80	2	6 .28

A TABLE

A Table which by the Diameter of any Maff
Tun, fhews the Content upon an Inch in
Bushels, Gallons, and one hundred parts.

Inches of Diam.	Bush.	Gal. and parts.	Inches of Diam.	Bush.	Gal. and parts.
81	2	6 .85	101	4	3 .51
82	2	7 .41	102	4	4 .22
83	2	7 .99	103	4	4 .94
84	3	0 .56	104	4	5 .65
85	3	1 .15	105	4	6 .39
86	3	1 .75	106	4	7 .11
87	3	2 .35	107	4	7 .86
88	3	2 .96	108	5	0 .61
89	3	3 .57	109	5	1 .36
90	3	4 .20	110	5	2 .12
91	3	4 .82	111	5	2 .90
92	3	5 .46	112	5	3 .67
93	3	6 .11	113	5	4 .45
94	3	7 .76	114	5	5 .25
95	3	0 .42	115	5	6 .04
96	4	0 .09	116	5	6 .85
97	4	1 .76	117	5	7 .66
98	4	2 .44	118	6	0 .48
99	4	2 .11	119	6	1 .30
100	4	2 .81	120	6	2 .14

A Table

A Table which by the Diameter of any Mafh-Tun, fhews the Content upon an Inch in Bufhels, Gallons, and one hundred parts.

Inches of Diam.	Bufh.	Gal. and parts.	Inches of Diam.	Bufh.	Gal. and parts.
121	6	2 .98	141	8	5 .21
122	6	3 .81	142	8	6 .20
123	6	4 .67	143	8	7 .19
124	6	5 .52	144	9	0 .19
125	6	6 .40	145	9	1 .20
126	6	7 .28	146	9	2 .21
127	7	0 .15	147	9	3 .22
128	7	1 .04	148	9	4 .25
129	7	1 .94	149	9	5 .29
130	7	2 .84	150	9	6 .32
131	7	3 .75	151	9	7 .38
132	7	4 .66	152	10	0 .44
133	7	5 .59	153	10	1 .50
134	7	6 .51	154	10	2 .56
135	7	7 .45	155	10	3 .64
136	8	0 .39	156	10	4 .72
137	8	1 .34	157	10	5 .81
138	8	2 .30	158	10	6 .91
139	8	3 .26	159	11	0 .01
140	8	4 .24	160	11	1 .12

A TABLE

A Table which by the Diameter of any Mash-Tun, shews the Content upon an Inch in Bushels, Gallons, and one hundred parts.

Inches of Diam.	Bush.	Gal. and parts.	Inches of Diam.	Bush.	Gal. and parts.
161	11	2 .25	181	14 2	.08
162	11	3 .38	182	14 3	.34
163	11	4 .50	183	14 4	.61
164	11	5 .65	184	14 5	.89
165	11	6 .80	185	14 7	.17
166	11	7 .95	186	15 0	.46
167	12	1 .11	187	15 1	.76
168	12	2 .28	188	15 3	.06
169	12	3 .45	189	15 4	.38
170	12	4 .62	190	15 5	.69
171	12	5 .81	191	15 7	.02
172	12	7 .01	192	16 0	.34
173	13	0 .21	193	16 1	.70
174	13	1 .41	194	16 3	.05
175	13	2 .63	195	16 4	.40
176	13	3 .84	196	16 5	.76
177	13	5 .08	197	16 7	.12
178	13	6 .32	198	17 0	.49
179	13	7 .56	199	17 1	.86
180	14	0 .81	200	17 3	.25

Y

A Table

A Table of AREA'S of CIRCLES for
the Gauging of Beer or Ale Vessels, accord-
ing to Two hundred eighty two Cubical
Inches to the Gallon.

I. D.	0	1	2	3	4
	G.parts	G.parts	G.parts	G.parts	G.parts
1	0.0028	0.0034	0.0040	0.0047	0.0055
2	0.0111	0.0122	0.0134	0.0147	0.0160
3	0.0251	0.0268	0.0286	0.0304	0.0322
4	0.0446	0.0469	0.0492	0.0516	0.0540
5	0.0696	0.0724	0.0753	0.0782	0.0812
6	0.1003	0.1037	0.1072	0.1107	0.1142
7	0.1365	0.1404	0.1444	0.1484	0.1525
8	0.1782	0.1826	0.1871	0.1917	0.1964
9	0.2256	0.2306	0.2357	0.2409	0.2461
10	0.2785	0.2841	0.2898	0.2955	0.3013
11	0.3370	0.3431	0.3493	0.3555	0.3618
12	0.4011	0.4079	0.4147	0.4215	0.4284
13	0.4707	0.4780	0.4853	0.4927	0.5001
14	0.5459	0.5537	0.5616	0.5695	0.5775
15	0.6266	0.6349	0.6433	0.6518	0.6604
16	0.7130	0.7219	0.7309	0.7399	0.7490
17	0.8049	0.8144	0.8239	0.8335	0.8432
18	0.9024	0.9125	0.9226	0.9327	0.9429
19	1.0054	1.0160	1.0267	1.0374	1.0482
20	1.1140	1.1251	1.1363	1.1476	1.1590

Inches of the Diameter.

A Table

A Table of AREA'S of CIRCLES for
the Gauging of Beer or Ale Vessels, accord-
ing to Two hundred eighty two Cubical
Inches to the Gallon.

5	6	7	8	9
G.parts	G.parts	G.parts	G.parts	G.parts
0.0063	0.0072	0.0081	0.0091	0.0100
0.0174	0.0188	0.0203	0.0218	0.0234
0.0341	0.0361	0.0381	0.0402	0.0424
0.0564	0.0589	0.0615	0.0642	0.0669
0.0842	0.0873	0.0904	0.0936	0.0969
0.1177	0.1213	0.1250	0.1288	0.1326
0.1567	0.1609	0.1652	0.1695	0.1738
0.2012	0.2060	0.2109	0.2158	0.2207
0.2514	0.2567	0.2620	0.2674	0.2729
0.3071	0.3130	0.3189	0.3249	0.3309
0.3682	0.3746	0.3811	0.3877	0.3944
0.4352	0.4422	0.4492	0.4565	0.4635
0.5076	0.5151	0.5227	0.5304	0.5381
0.5856	0.5937	0.6019	0.6101	0.6183
0.6691	0.6778	0.6865	0.6953	0.7041
0.7582	0.7674	0.7767	0.7860	0.7954
0.8529	0.8627	0.8725	0.8824	0.8924
0.9532	0.9636	0.9740	0.9844	0.9949
1.0590	1.0699	1.0809	1.0919	0.1029
1.1704	1.1818	1.1933	1.2040	0.2165

A Table of AREA'S of CIRCLES for
the Gauging of Beer or Ale Vessels, accord-
ing to Two hundred eighty two Cubical
Inches to the Gallon..

I. D.	0	1	2	3	4
	G.parts	G.parts	G.parts	G.parts	G.parts
21	1.2282	1.2399	1.2517	1.2636	1.2755
22	1.3480	1.3603	1.3727	1.3851	1.3975
23	1.4733	1.4861	1.4990	1.5120	1.5250
24	1.6042	1.6176	1.6310	1.6445	1.6581
25	1.7407	1.7546	1.7686	1.7827	1.7968
26	1.8827	1.8972	1.9118	1.9264	1.9411
27	2.0303	2.0454	2.0605	2.0757	2.0909
28	2.1835	2.1991	2.2148	2.2305	2.2463
29	2.3423	2.3585	2.3747	2.3910	2.4073
30	2.5066	2.5233	2.5401	2.5569	2.5738
31	2.6765	2.6938	2.7112	2.9286	2.7461
32	2.8519	2.8697	2.8876	2.9055	2.9236
33	3.0330	3.0514	3.0698	3.0883	3.1069
34	3.2196	3.2386	3.2576	3.2767	3.2958
35	3.4117	3.4312	3.4508	3.4704	3.4901
36	3.6095	3.6296	3.6497	3.6699	3.6901
37	3.8128	3.8335	3.8542	3.8749	3.8957
38	4.0217	4.0429	4.0642	4.0855	4.1068
39	4.2361	4.2579	4.2797	4.3016	4.3235
40	4.4562	4.4785	4.5009	4.5233	4.5458

A Table

A Table of AREA'S of CIRCLES for
the Gauging of Beer or Ale Vessels, accord-
ing to Two hundred Eighty two Cubical
Inches to the Gallon.

5	6	7	8	9
G. parts	G. parts	G. parts	G. parts	G. parts
1.2874	1.2994	1.3114	1.3236	1.3357
1.4100	1.4225	1.4351	1.4478	1.4605
1.5381	1.5512	1.5644	1.5776	1.5909
1.6218	1.6855	1.6992	1.7130	1.7268
1.8110	1.8252	1.8395	1.8538	1.8682
1.9558	1.9706	1.9854	2.0003	2.0153
2.1062	2.1215	2.1369	2.1524	2.1679
2.2622	2.2781	2.2941	2.3101	2.3262
2.4237	2.4402	2.4567	2.4733	2.4899
2.5908	2.1078	2.6249	2.6420	2.6592
2.7635	2.7811	2.7987	2.8164	2.8341
2.9418	2.9600	2.9782	2.9964	3.0147
3.1256	3.1443	3.1630	3.1818	3.2007
3.3150	3.3342	3.3535	3.3728	3.3922
3.5099	3.5297	3.5496	3.5695	3.5875
3.7104	3.7307	3.7511	3.7716	3.7922
3.9165	3.9374	3.9584	3.9794	4.0005
4.1282	4.1496	4.1711	4.1927	4.2144
4.3455	4.3675	4.3836	4.4117	4.4339
4.5683	4.5909	4.6135	4.6367	4.6590

A Table

A Table of AREA'S of CIRCLES for
the Gauging of Beer or Ale Vessels accord-
ing to Two hundred eighty two Cubical
Inches to the Gallon,

I.					
	D.	G.parts	G.parts	G.parts	G.parts
Inches of the Diameter.	41	4.6818	4.7047	4.7276	4.7506
	42	4.9129	4.9363	4.9598	4.9833
	43	5.1497	5.1737	5.1977	5.2218
	44	5.3920	5.4166	5.4412	5.4658
	45	5.6328	5.6649	5.6901	5.7153
	46	5.8933	5.9189	5.9446	5.9704
	47	6.1523	6.1785	6.2048	6.2311
	48	6.4169	6.4437	6.4705	6.4974
	49	6.6870	6.7143	6.7417	6.7691
	50	6.9628	6.9907	7.0186	7.0466
	51	7.2440	7.2724	7.3009	7.3295
	52	7.5509	7.5599	7.5889	7.6180
	53	7.8233	7.8529	7.8825	7.9122
	54	8.1214	8.1529	8.1817	8.2110
	55	8.4249	8.4555	8.4862	8.5170
	56	8.7341	8.7953	8.7965	8.8278
	57	9.0488	9.0806	9.1124	9.1443
	58	9.3691	9.4015	9.4339	9.4663
	59	9.6919	9.7278	9.7608	9.7938
	60	10.0264	10.0598	10.0933	10.1269

A Table

A Table of AREA'S of CIRCLES for
the Gauging of Beer or Ale Vessels, accord-
ing to Two hundred eighty two Cubical
Inches to the Gallon.

5	6	7	8	9
G.parts	G.parts	G.parts	G.parts	G.parts
4.7966	4.8197	4.8429	4.8662	4.8895
5.0306	5.0543	5.0781	5.1019	5.1258
5.2701	5.2943	5.3186	5.3430	5.3675
5.5152	5.5400	5.5648	5.5897	5.6147
5.7659	5.7913	5.8167	5.8422	5.8677
6.0221	6.0480	6.0740	6.1000	6.1261
6.2839	6.3104	6.3369	6.3635	6.3903
6.5513	6.5783	6.6054	6.6325	6.6597
6.8242	6.8518	6.8795	6.9072	6.9350
7.1027	7.1308	7.1590	7.1873	7.2156
7.3868	7.4155	7.4443	7.4731	7.5020
7.6764	7.7057	7.7350	7.7644	7.7938
7.9717	8.0015	8.0314	8.0613	8.0913
8.2724	8.3028	8.3333	8.3638	8.3943
8.5788	8.6098	8.6408	8.6719	8.7030
8.8907	8.9222	8.9538	8.9854	9.0171
9.2082	9.2402	9.2723	9.3045	9.3366
9.5313	9.5639	9.5965	9.6292	9.6620
9.8600	9.8932	9.9264	9.9597	9.9930
10.1942	10.2279	10.2617	10.2955	10.3294

A Table

A Table of AREA'S of CIRCLES for
the Gauging of Wine Vessels, according to
Two hundred thirty one Cubical Inches to
the Gallon.

I. D.	0	1	2	3	4
	G.parts	G.parts	G.parts	G.parts	G.parts
1	0.0034	0.0041	0.0049	0.0057	0.0067
2	0.0136	0.0150	0.0165	0.0180	0.0196
3	0.0306	0.0326	0.0347	0.0369	0.0392
4	0.0544	0.0572	0.0600	0.0629	0.0659
5	0.0850	0.0884	0.0919	0.0955	0.0991
6	0.1224	0.1265	0.1307	0.1350	0.1393
7	0.1666	0.1714	0.1763	0.1812	0.1862
8	0.2176	0.2231	0.2287	0.2343	0.2400
9	0.2754	0.2815	0.2877	0.2944	0.3004
10	0.3400	0.3468	0.3537	0.3607	0.3678
11	0.4114	0.4189	0.4265	0.4341	0.4418
12	0.4896	0.4998	0.5061	0.5144	0.5228
13	0.5746	0.5835	0.5925	0.6055	0.6106
14	0.6664	0.6760	0.6856	0.6953	0.7051
15	0.7650	0.7752	0.7855	0.7959	0.8064
16	0.8704	0.8813	0.8923	0.9034	0.9145
17	0.9826	0.9942	1.0059	1.0176	1.0294
18	1.1016	1.1139	1.1263	1.1386	1.1512
19	1.2274	1.2404	1.2534	1.2665	1.2797
20	1.3600	1.3736	1.3873	1.4011	1.4149

Inches of the Diameter.

A Table

A Table of AREA'S of CIRCLES for
the Gauging of Wine Vessels, according to
Two hundred thirty one Cubical Inches to
the Gallon.

5	6	7	8	9
G.parts	G.parts	G.parts	G.parts	G.parts
0.0077	0.0097	0.0098	0.0110	0.0123
0.0213	0.0230	0.0248	0.0267	0.0286
0.0416	0.0440	0.0465	0.0491	0.0517
0.0689	0.0720	0.0751	0.0783	0.0816
0.1029	0.1067	0.1106	0.1145	0.1184
0.1437	0.1482	0.1527	0.1573	0.1619
0.1913	0.1964	0.2016	0.2079	0.2122
0.2457	0.2515	0.2574	0.2633	0.2693
0.3069	0.3134	0.3200	0.3266	0.3333
0.3749	0.3821	0.3893	0.3966	0.4040
0.4497	0.4776	0.4655	0.4735	0.4815
0.5313	0.5398	0.5484	0.5571	0.5658
0.6197	0.6289	0.6382	0.6475	0.6569
0.7149	0.7248	0.7348	0.7448	0.7549
0.8169	0.8275	0.8381	0.8488	0.8596
0.9257	0.9369	0.9482	0.9596	0.9711
1.0413	1.0532	1.0652	1.0773	1.0894
1.1637	1.1763	1.1890	1.2017	1.2145
1.2929	1.3062	1.3195	1.3329	1.3464
1.4289	1.4428	1.4569	1.4710	1.4851

A Table

A Table of AREA'S of CIRCLES for
the Gauging of Wine Vessels, according to
Two hundred thirty one Cubical Inches to
the Gallon.

I. D.	0	1	3	4	5
	G.parts	G.parts	G.parts	G.parts	G.parts
21	1.4994	1.5137	1.5281	1.5425	1.5570
22	1.6456	1.6606	1.6757	1.6908	1.7060
23	1.7986	1.8142	1.8299	1.8457	1.8616
24	1.9584	1.9747	1.9911	2.0076	2.0242
25	2.1125	2.1420	2.1591	2.1763	2.1936
26	2.9984	2.3161	2.3336	2.3513	2.3697
27	2.4786	2.4970	2.5155	2.5340	2.5526
28	2.6656	2.6847	2.7038	2.7230	2.7423
29	2.8594	2.8791	2.8989	2.9188	2.9388
30	3.0600	3.0804	3.1009	3.1215	3.1422
31	3.2674	3.2885	3.3097	3.3309	3.3522
32	3.4816	3.5034	3.5253	3.5472	3.5692
33	3.7026	3.7251	3.7476	3.7702	3.7929
34	3.9304	3.9536	3.9768	4.0001	4.0235
35	4.1650	4.1888	4.2127	4.2367	4.2608
36	4.4064	4.4309	4.4555	4.4802	4.5049
37	4.6546	4.6798	4.6051	4.7304	4.7558
38	4.9096	4.9355	4.9614	4.9874	5.0135
39	5.1714	5.1980	5.2246	5.2513	5.2781
40	5.4400	5.4673	5.4946	5.5220	5.5494

Inches of the Diameter.

A Table

A Table of AREA'S of CIRCLES for
the Gauging of Wine Vessels, according to
Two hundred thirty one Cubical Inches to
the Gallon.

5	6	7	8	9
G.parts	G.parts	G.parts	G.parts	G.parts
1.5716	1.5862	1.0009	1.6157	1.6306
1.7213	1.7366	1.7520	1.7675	1.7830
1.8777	1.8937	1.9098	1.9259	1.9421
2.0409	2.0576	2.0744	2.0912	2.1081
2.2109	2.2283	2.2458	2.2633	2.2818
2.3877	2.4057	2.4238	2.4419	2.4603
2.5713	2.5900	2.6088	2.6277	2.6466
2.7617	2.7811	2.8006	2.8201	2.8397
2.9589	2.9789	2.9992	3.0194	3.0396
3.1629	3.1837	3.2045	3.2254	3.2464
3.3736	3.3951	3.4166	3.4382	3.4599
3.5913	3.6134	3.6356	3.6578	3.6802
3.8157	3.8385	3.8614	3.8843	3.9073
4.0469	4.0704	4.0940	4.1176	4.1413
4.2849	4.3091	4.3333	4.3576	4.3820
4.5297	4.5545	4.5794	4.6044	4.6295
4.7813	4.8068	4.8324	4.8581	4.8838
5.0397	5.0659	5.0922	5.1185	5.1449
5.3049	5.3318	5.3588	5.3858	5.4128
5.5765	5.6044	5.6320	5.6597	5.6875

A Table

A Table of AREA'S of CIRCLES for
 of the Gauging of Wine Vessels, according to
 of Two hundred thirty one Cubical Inches to
 the Gallon.

I.	0		1		2	3	4
	D.	G.parts	D.	G.parts	G.parts	G.parts	G.parts
41	5.7	154	5.7	434	5.7714	5.7994	5.8275
42	5.9	976	6.0	262	6.0549	6.0836	6.1124
43	6.2	866	6.3	159	6.3452	6.3746	6.4041
44	6.5	824	6.6	124	6.6424	6.6725	6.7027
45	6.8	850	6.9	156	6.9463	6.9771	7.0079
46	7.1	944	7.2	257	7.2571	7.2886	7.3201
47	7.5	106	7.5	426	7.5747	7.6068	7.6390
48	7.8	336	7.8	663	7.8990	7.9318	7.9647
49	8.1	634	8.1	968	8.2302	8.2637	8.2973
50	8.5	000	8.5	340	8.5681	8.6023	8.6366
51	8.8	434	8.8	781	8.9129	8.9478	8.9827
52	9.1	936	9.2	290	9.2645	9.3000	9.3356
53	9.5	506	9.5	867	9.6228	9.6590	9.6953
54	9.9	144	9.9	512	9.9880	10.0249	10.0619
55	10.2	850	10.3	224	10.3599	10.3975	10.4352
56	10.6	624	10.7	005	10.7387	10.7770	10.8153
57	11.0	466	11.0	853	11.1243	11.1632	11.2022
58	11.4	376	11.4	771	11.5166	11.5562	11.5959
59	11.8	354	11.8	755	11.9157	11.9560	11.9964
60	12.2	400	12.2	808	12.3217	12.3627	12.4038

A Table

A Table of AREA'S of CIRCLES for
the Gauging of Wine Vessels, according to
Two hundred thirty one Cubical Inches to
the Gallon.

5	6	7	8	9
G. parts	G. parts	G. parts	G. parts	G. parts
5.8557	5.8840	5.9123	5.9407	5.9691
6.1413	6.1702	6.1992	6.2283	6.2574
6.4337	6.4633	6.4930	6.5227	6.5525
6.7329	6.7632	6.7935	6.8239	6.8544
7.0389	7.0969	7.1010	7.1321	7.1632
7.3517	7.3834	7.4151	7.4469	7.4787
7.6713	7.7036	7.7360	7.7685	7.8010
7.9977	8.0307	8.0638	8.0969	8.1301
8.3309	8.3649	8.3984	8.4322	8.4661
8.6709	8.7053	8.7397	8.7742	8.8088
9.0177	9.0528	9.0879	9.1231	9.1583
9.3713	9.4070	9.4428	9.4787	9.5146
9.7317	9.7681	9.8046	9.8411	9.8777
10.0989	10.1360	10.1731	10.2103	10.2476
10.4229	10.5107	10.5485	10.5864	10.6244
10.8537	10.8922	10.9307	10.9693	11.0079
11.2413	11.2804	11.3196	11.3589	11.3982
11.6357	11.6755	11.7154	11.7553	11.7953
12.0369	12.0774	12.1180	12.1586	12.1993
12.4449	12.4861	12.5273	12.5686	12.6000

A Table

Sybrant Hantz, his Table of *Areas of Segments of a Circle*, whose *Diameter* is supposed to be divided by the *Cord-lines* into 10000 equal parts, and the *Area* of the whole Circle Unity, or 100000 other parts.

Verf. Sine.	Segment.	Dif.	Segment.	Verf. Sine.
.0001				.9999
.0010	.00005 —	.10	.99995 +	.9990
.0020	.00015 —	.13	.99985 +	.9980
.0030	.00028 —	.15	.99972 —	.9970
.0040	.00043 —	.17	.99957 —	.9960
.0050	.00060 —	.19	.99940 —	.9950
—	—	—	—	—
.0060	.00079 —	.20	.99921 —	.9940
.0070	.00099 —	.22	.99901 —	.9930
.0080	.00121 —	.24	.99879 —	.9920
.0090	.00145 —	.24	.99855 —	.9910
.0100	.00169 —	.26	.99831 —	.9900
—	—	—	—	—
.0110	.00195 —	.27	.99805 —	.9890
.0120	.00222 —	.28	.99778 —	.9880
.0130	.00250 —	.29	.99750 —	.9870
.0140	.00279 —	.31	.99721 —	.9860
.0150	.00310 —	.32	.99690 —	.9850
—	—	—	—	—
.0160	.00342 —	.32	.99658 —	.9840
.0170	.00374 —	.34	.99626 —	.9830
.0180	.00408 —	.34	.99592 —	.9820
.0190	.00442 —	.35	.99558 —	.9810
.0200	.00477 —	.36	.99523 —	.9800

Sybrant Hantz, his Table of *Area's of Segments of a Circle*, whose *Diameter* is supposed to be divided by the *Chord-lines* into 10000 equal parts, and the *Area* of the whole Circle Unity, or 100000 other parts.

Verf.Sine.	Segment.	Diff.	Segment.	Verf.Sine.
.0210	.00513—	.37	.99487— $\frac{1}{1}$	.9790
.0220	.00550—	.38	.99450— $\frac{1}{1}$	.9780
.0230	.00588—	.39	.99412— $\frac{1}{1}$	.9770
.0240	.00627— $\frac{1}{1}$	.39	.99373—	.9760
.0250	.00666—	.40	.99334— $\frac{1}{1}$	.9750
.0260	.00706—	.41	.99294— $\frac{1}{1}$	.9740
.0270	.00747— $\frac{1}{1}$	.42	.99253—	.9730
.0280	.00789— $\frac{1}{1}$	.42	.99211—	.9720
.0290	.00831— $\frac{1}{1}$	.43	.99169—	.9710
.0300	.00874— $\frac{1}{1}$	.44	.99126—	.9700
.0310	.00918— $\frac{1}{1}$	.45	.99082—	.9680
.0320	.00963— $\frac{1}{1}$	.46	.99037—	.9660
.0330	.01009— $\frac{1}{1}$	.46	.98991—	.9670
.0340	.01055— $\frac{1}{1}$	.45	.98945—	.9660
.0350	.01100— $\frac{1}{1}$	.48	.98900—	.9650
.0360	.01148— $\frac{1}{1}$	.47	.98852—	.9640
.0370	.01195— $\frac{1}{1}$	.48	.98805—	.9630
.0380	.01243—	.48	.98757— $\frac{1}{1}$	.9620
.0390	.01291— $\frac{1}{1}$	.50	.98709—	.9610
.0400	.01341—	.49	.98659— $\frac{1}{1}$	.9600

A Table

Sybrant Hantz, his Table of *Area's of Segments of a Circle*, whose *Diameter* is supposed to be divided by the *Chord-lines* into 10000 equal parts, and the *Area* of the whole Circle Unity, or 100000 other parts.

Verf.Sine.	Segment.	Dif.	Segment.	Verf.Sine.
.0410	.01390—	51	.98610—	.9590
.0420	.01441—	52	.98559—	.9580
.0430	.01493—	53	.98507—	.9570
.0440	.01546—	53	.98454—	.9560
.0450	.01599—	53	.98401—	.9550
—		—	—	
.0460	.01652—	54	.98348—	.9540
.0470	.01706—	54	.98294—	.9530
.0480	.01760—	54	.98240—	.9520
.0490	.01814—	55	.98186—	.9510
.0500	.01869—	56	.98131—	.9500
—		—	—	
.0510	.01925—	57	.98075—	.9490
.0520	.01982—	57	.98018—	.9480
.0530	.02039—	57	.97961—	.9470
.0540	.02096—	57	.97904—	.9460
.0550	.02153—	59	.97847—	.9450
—		—	—	
.0560	.02212—	58	.97788—	.9440
.0570	.02270—	59	.97738—	.9430
.0580	.02329—	60	.97671—	.9420
.0590	.02389—	61	.97611—	.9410
.0600	.02450—	60	.97550—	.9400

Sybrant Hantz, his Table of *Area's of Segments of a Circle*, whose *Diameter* is supposed to be divided by the *Chord-lines* into 10000 equal parts, and the *Area* of the whole Circle Unity, or 100000 other parts.

Verf. Sine.	Segment.	Dif.	Segment.	Verf. Sine.
.0600	.02510—	.51	.97490—	.9390
.0620	.02571—	.62	.97429—	.9380
.0630	.02633—	.62	.97367—	.9370
.0640	.02695—	.63	.97305—	.9360
.0650	.02758—	.63	.97242—	.9350
.0660	.02821—	.63	.97179—	.9340
.0670	.02884—	.64	.97116—	.9330
.0680	.02948—	.64	.97052—	.9320
.0690	.03012—	.65	.96988—	.9310
.0700	.03077—	.65	.96923—	.9300
.0710	.03142—	.66	.96858—	.9290
.0720	.03208—	.66	.96792—	.9280
.0730	.03274—	.66	.96726—	.9270
.0740	.03340—	.67	.96660—	.9260
.0750	.03407—	.68	.96593—	.9250
.0760	.03475—	.67	.96525—	.9240
.0770	.03542—	.68	.96458—	.9230
.0780	.03610—	.69	.96390—	.9220
.0790	.03679—	.69	.96321—	.9210
.0800	.03748—	.69	.96252—	.9200

Sybrant Hantz, his Table of *Areas of Segments of a Circle*, whose *Diameter* is supposed to be divided by the *Cord-lines* into 10000 equal parts, and the *Area* of the whole Circle Unity, or 100000 other parts.

Verf. Sine.	Segment.	Dif.	Segment.	Verf. Sine.
.0810	.03817—	.70	.96183—	.9190
.0820	.03887—	.70	.96113—	.9180
.0830	.03957—	.70	.96043—	.9170
.0840	.04027—	.71	.95973—	.9160
.0850	.04098—	.71	.95902—	.9150
.0860	.04169—	.72	.95831—	.9140
.0870	.04241—	.72	.95759—	.9130
.0880	.04313—	.72	.95687—	.9120
.0890	.04385—	.73	.95615—	.9110
.0900	.04458—	.73	.95542—	.9100
.0910	.04531—	.73	.95469—	.9090
.0920	.04604—	.74	.95396—	.9080
.0930	.04678—	.74	.95322—	.9070
.0940	.04752—	.75	.95248—	.9060
.0950	.04827—	.74	.95173—	.9050
.0960	.04901—	.76	.95099—	.9040
.0970	.04977—	.75	.95023—	.9030
.0980	.05052—	.76	.94948—	.9020
.0990	.05128—	.76	.94872—	.9010
.1000	.05204—	.77	.94796—	.9000

Sybrant Hantz, his Table of *Area's of Segments of a Circle*, whose *Diameter* is supposed to be divided by the *Chord* lines into 10000 equal parts, and the *Area* of the whole Circle Unity, or 100000 other parts.

Verf. Sine.	Segment.	Dif.	Segment.	Verf. Sine.
.1010	.05281—		.94719—	.8990
.1020	.05358—	.77	.94642—	.8980
.1030	.05435—	.77	.94565—	.8970
.1040	.05513—	.78	.94487—	.8960
.1050	.05591—	.78	.94409—	.8950
.1060	.05669—	.78	.94331—	.8940
.1070	.05747—	.79	.94253—	.8930
.1080	.05826—	.79	.94174—	.8920
.1090	.05905—	.80	.94095—	.8910
.1100	.05985—	.80	.94015—	.8900
.1110	.06065—	.80	.93935—	.8890
.1120	.06145—	.81	.93855—	.8880
.1130	.06226—	.81	.93774—	.8870
.1140	.06307—	.81	.93693—	.8860
.1150	.06388—	.81	.93612—	.8850
.1160	.06469—	.82	.93531—	.8840
.1170	.06551—	.82	.93449—	.8830
.1180	.06633—	.82	.93367—	.8820
.1190	.06715—	.82	.93285—	.8810
.1200	.06797—	.83	.93203—	.8800

Sybrant Hantz, his Table of *Area's of Segments of a Circle*, whose *Diameter* is supposed to be divided by the *Chord-lines* into 10000 equal parts, and the *Area* of the whole Circle Unity, br 100000 other parts.

Verl.Sine.	Segment.	Dif.	Segment.	Verl.Sine.
.1210	.06880	.83	.93120	.8790
.1220	.06963	.83	.93037	.8780
.1230	.07046	.84	.92954	.8770
.1240	.07130	.84	.92870	.8760
.1250	.07214	.85	.92786	.8750
.1260	.07299	.86	.92701	.8740
.1270	.07384	.85	.92616	.8730
.1280	.07469	.85	.92531	.8720
.1290	.07554	.85	.92446	.8710
.1300	.07639	.86	.92361	.8700
.1310	.07725	.86	.92275	.8690
.1320	.07811	.86	.92189	.8680
.1330	.07897	.87	.92103	.8670
.1340	.07984	.87	.92016	.8660
.1350	.08071	.87	.91929	.8650
.1360	.08158	.88	.91842	.8640
.1370	.08246	.87	.91754	.8630
.1380	.08333	.88	.91667	.8620
.1390	.08421	.88	.91579	.8610
.6400	.08509	.89	.91491	.8600

A Table

Sybraut Hantz, his Table of *Area's of Segments of a Circle*, whole *Diameter* is supposed to be divided by the *Chord-lines* into 10000 equal parts, and the *Area* of the whole Circle Unity, or 100000 other parts.

Verf. Sine.	Segment.	Diff.	Segment.	Verf. Sine.
.1410	.08598	.89	.91402	.8590
.1420	.08687	.89	.91313	.8580
.1430	.08776	.89	.91224	.8570
.1440	.08865	.90	.91135	.8560
.1450	.08955	.90	.91045	.8550
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.1460	.09045	.90	.90955	.8540
.1470	.09135	.90	.90865	.8530
.1480	.09225	.90	.90775	.8520
.1490	.09315	.91	.90685	.8510
.1500	.09406	.91	.90594	.8500
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.1510	.09497	.91	.90503	.8490
.1520	.09588	.91	.90412	.8480
.1530	.09679	.92	.90321	.8470
.1540	.09771	.91	.90229	.8460
.1550	.09863	.92	.90137	.8450
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.1560	.09955	.93	.90045	.8440
.1570	.10048	.93	.89952	.8430
.1580	.10141	.93	.89859	.8420
.1590	.10234	.94	.89766	.8410
.1600	.10328	.94	.89672	.8400

Sybrant Hantz, his Table of *Area's of Segments of Circles*, whose *Diameter* is supposed to be divided by the *Chord-lines* into 10000 equal parts, and the *Area* of the whole Circle Unity, or 100000 other parts.

Verf. Sine.	Segment.	Dit. Segment.	Verf. Sine
.1610	.10422	.94 .89578	.8390
.1620	.10516	.94 .89484	.8380
.1630	.10610	.94 .89390	.8370
.1640	.10704	.94 .89296	.8360
.1650	.10799	.95 .89201	.8350
.1660	.10894	.95 .89106	.8340
.1670	.10989	.95 .89011	.8330
.1680	.11084	.95 .88916	.8320
.1690	.11179	.95 .88821	.8310
.1700	.11275	.96 .88725	.8300
.1710	.11371	.96 .88629	.8290
.1720	.11467	.96 .88533	.8280
.1730	.11563	.96 .88437	.8270
.1740	.11659	.96 .88341	.8260
.1750	.11715	.97 .85245	.8250
.1760	.11852	.97 .88148	.8240
.1770	.11949	.97 .88051	.8230
.1780	.12046	.97 .87854	.8220
.1790	.12143	.97 .87857	.8210
.6800	.12240	.98 .87760	.8200

Sybrant Hantz his Table of *Area's of Segments of a Circle*, whose *Diameter* is supposed to be divided by the *Chord* lines into 10000 equal parts, and the *Area* of the whole Circle Unit/5 of 100000 other parts.

Verf. Sine.	Segment.	Dif.	Segment.	Verf. Sine.
.1810	.12338—	.98	.87662—	.8190
.1820	.12436—	.98	.87564—	.8180
.1830	.12534—	.99	.87466—	.8170
.1840	.12633—	.99	.87367—	.8160
.1850	.12732—	.99	.87268—	.8150
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.1860	.12831—	.99	.87169—	.8140
.1870	.12930—	.100	.87070—	.8130
.1880	.13030—	.99	.86970—	.8120
.1890	.13129—	.100	.86871—	.8110
.1900	.13229—	.100	.86771—	.8100
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.1910	.13329—	.100	.86661—	.8090
.1920	.13429—	.100	.86571—	.8080
.1930	.13529—	.101	.86471—	.8070
.1940	.13630—	.101	.86370—	.8060
.1950	.13731—	.101	.86279—	.8050
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.1960	.13731—	.101	.86168—	.8040
.1970	.13933—	.101	.86067—	.8030
.1980	.14034—	.102	.85966—	.8020
.1990	.14136—	.102	.85864—	.8010
.2000	.14238—	.102	.85762—	.8000

Sybrant Hantz, his Table of *Area's of Segments of a Circle*, whose *Diameter* is supposed to be divided by the *Chord-lines* into 10000 equal parts, and the *Area* of the whole Circle Unity, or 100000 other parts.

Verf. Sine.	Segment.	Dif.	Segment.	Verf. Sine.
.2010	.14340	.102	.85660	.7990
.2020	.14442	.102	.85558	.7980
.2030	.14544	.103	.85456	.7970
.2040	.14647	.103	.85353	.7960
.2050	.16750	.103	.85250	.7950
.2060	.14853	.103	.85147	.7940
.2070	.14956	.103	.85044	.7930
.2080	.15059	.103	.84941	.7920
.2090	.15162	.103	.84838	.7910
.2100	.15265	.104	.84735	.7900
.2110	.15369	.104	.84631	.7890
.2120	.15473	.104	.84527	.7880
.2130	.15577	.104	.84423	.7870
.2140	.15681	.104	.84319	.7860
.2150	.15785	.105	.84215	.7850
.2160	.15890	.105	.84110	.7840
.2170	.15995	.105	.84005	.7830
.2180	.16100	.106	.83900	.7820
.2190	.16206	.106	.83794	.7810
.2200	.16312	.106	.83688	.7800

A Table

Sybrant Hæver, his Table of Area's of Segments of a Circle, whose Diameter is supposed to be divided by the Chord-lines into 10000 equal parts, and the Area of the whole Circle Unity, or 100000 other parts.

Verf. Sine.	Segment.	Diff.	Segment.	Verf. Sine.
.2210	.16418	.106	.83582	.7790
.2220	.16524	.105	.83476	.7780
.2230	.16629	.106	.83371	.7770
.2240	.16735	.106	.83265	.7760
.2250	.16841	.107	.83159	.7750
.2260	.16948	.107	.83052	.7740
.2270	.17055	.107	.82945	.7730
.2280	.17162	.106	.82838	.7720
.2290	.17268	.107	.82732	.7710
.2300	.17375	.107	.82625	.7700
.2310	.17482	.108	.82518	.7690
.2320	.17590	.108	.82410	.7680
.2330	.17698	.107	.82302	.7670
.2340	.17805	.108	.82195	.7660
.2350	.17913	.108	.82087	.7650
.2360	.18021	.108	.81979	.7640
.2370	.18129	.109	.81871	.7630
.2380	.18238	.108	.81762	.7620
.2390	.18346	.109	.81654	.7610
.2400	.18455	.109	.81545	.7600

Sybrant Hantz, his Table of Area's of Segments of a Circle, whose Diameter is supposed to be divided by the Chord-lines into 10000 equal parts, and the Area of the whole Circle Unity; or 10000 other parts.

Vert. Sine.	Segment.	Diff.	Segment.	Vert. Sine.
0.2410	.185648	.109	.81436	0.7590
0.2420	.186737	.109	.813271	0.7580
0.2430	.187821	.109	.812181	0.7570
0.2440	.188912	.110	.811094	0.7560
0.2450	.190014	.109	.809999	0.7550
0.2460	.191108	.110	.808900	0.7540
0.2470	.192200	.110	.807800	0.7530
0.2480	.193300	.110	.806700	0.7520
0.2490	.194400	.110	.805600	0.7510
0.2500	.195500	.110	.804500	0.7500
0.2510	.196600	.111	.803400	0.7490
0.2520	.197710	.111	.802290	0.7480
0.2530	.198820	.110	.801180	0.7470
0.2540	.199920	.111	.800080	0.7460
0.2550	.201030	.111	.798970	0.7450
0.2560	.202140	.111	.797860	0.7440
0.2570	.203250	.112	.796750	0.7430
0.2580	.204370	.111	.795630	0.7420
0.2590	.205480	.112	.794520	0.7410
0.2600	.206600	.112	.793400	0.7400

Sybrant Hantz, his Table of *Area's of Segments of a Circle*, whose *Diameter* is supposed to be divided by the *Chord-lines* into 10000 equal parts, and the *Area* of the whole Circle Unity, or 100000 other parts.

Verf. Sine.	Segment.	Dif.	Segment.	Verf. Sine.
.2610	.20772	.112	.79228	.7390
.2620	.20884	.112	.79116	.7380
.2630	.20996	.112	.79004	.7370
.2640	.21108	.112	.78892	.7360
.2650	.21220	.113	.78780	.7350
.2660	.21333	.113	.78667	.7340
.2670	.21446	.112	.78554	.7330
.2680	.21558	.113	.78442	.7320
.2690	.21671	.113	.78329	.7310
.2700	.21784	.113	.78216	.7300
.2710	.22897	.113	.78103	.7290
.2720	.22010	.114	.77990	.7280
.2730	.22124	.113	.77876	.7270
.2740	.22237	.114	.77763	.7260
.2750	.22351	.113	.77649	.7250
.2760	.22464	.114	.77536	.7240
.2770	.22578	.114	.77422	.7230
.2780	.22692	.114	.77308	.7220
.2790	.22806	.114	.77194	.7210
.2800	.22920	.115	.77080	.7200

Sybrant Hantz his Table of *Area's of Segments of a Circle*, whose *Diameter* is supposed to be divided by the *Chord* lines into 10000 equal parts, and the *Area* of the whole Circle Unity, or 100000 other parts.

Verf. Sine	Segment	Dif.	Segment	Verf. Sine
00.2810	.23035	.115	.76965	.7190
08.2820	.23150	.114	.76850	.7180
07.2830	.23264	.115	.76736	.7170
00.2840	.23379	.115	.76621	.7160
07.2850	.23494	.115	.76506	.7150
04.2860	.23609	.115	.76391	.7140
03.2870	.23724	.115	.76276	.7130
08.2880	.23839	.116	.76161	.7120
01.2890	.23955	.115	.76045	.7110
00.2900	.24070	.116	.75930	.7100
00.2910	.24186	.116	.75814	.7090
08.2920	.24302	.116	.75698	.7080
07.2930	.24418	.116	.75582	.7070
00.2940	.24534	.116	.75466	.7060
07.2950	.24650	.116	.75350	.7050
04.2960	.24766	.116	.75234	.7040
03.2970	.24882	.116	.75118	.7030
08.2980	.24998	.117	.75002	.7020
01.2990	.25115	.117	.74885	.7010
00.3000	.25232	.116	.74764	.7000

Sybrant Hantz his Table of Area's of Segments of a Circle, whole Diameter is supposed to be divided by the Chord-lines into 10000 equal parts, and the Area of the whole Circle Unity, or 10000 other parts.

Verf. Sine.	Segment.	Dif.	Segment.	Verf. Sine.
.3010	.25348	.117	.74652	.6990
.3020	.25465	.117	.74535	.6980
.3030	.25582	.117	.74418	.6970
.3040	.25699	.117	.74301	.6960
.3050	.25816	.117	.74184	.6950
.3060	.25933	.118	.74067	.6940
.3070	.26051	.118	.73949	.6930
.3080	.26169	.118	.73831	.6920
.3090	.26286	.118	.73714	.6910
.3100	.26404	.118	.73596	.6900
.3110	.26522	.118	.73478	.6890
.3120	.26640	.118	.73360	.6880
.3130	.26758	.118	.73242	.6870
.3140	.26876	.118	.73124	.6860
.3150	.26994	.118	.73006	.6850
.3160	.27112	.119	.72888	.6840
.3170	.27231	.119	.72769	.6830
.3180	.27349	.119	.72651	.6820
.3190	.27468	.119	.72532	.6810
.3200	.27587	.119	.72413	.6800

Sylvanus Hantz, his Table of *Area's of Segments of a Circle*, whose *Diameter* is supposed to be divided by the *Chord* lines into 10000 equal parts, and the *Area* of the whole Circle Unity, or 100000 other parts.

Verf. Sine.	Segment.	Dif.	Segment.	Verf. Sine.
3210	.27706	.119	.72294	.6790
3220	.27825	.119	.72175	.6780
3230	.27944	.119	.72056	.6770
3240	.28063	.119	.71937	.6760
3250	.28182	.119	.71818	.6750
3260	.28301	.120	.71699	.6740
3270	.28421	.119	.71579	.6730
3280	.28540	.120	.71460	.6720
3290	.28660	.120	.71340	.6710
3300	.28780	.119	.71220	.6700
3310	.28899	.120	.71101	.6690
3320	.29019	.120	.70981	.6680
3330	.29139	.120	.70861	.6670
3340	.29259	.120	.70741	.6660
3350	.29379	.120	.70621	.6650
3360	.29499	.120	.70501	.6640
3370	.29619	.120	.70381	.6630
3380	.29739	.121	.70261	.6620
3390	.29860	.121	.70140	.6610
3400	.29981	.121	.70019	.6600

Sybrant Hantz, his Table of Area's of Segments of a Circle, whose Diameter is supposed to be divided by the Chord-lines into 10000 equal parts, and the Area of the whole Circle Unity, or 100000 other parts.

Verl.Sine.	Segment.	Dif.	Segment.	Verl.Sine.
.3410	.30102 —	.121	.62898 +	.6590
.3420	.30223 +	.121	.62777 —	.6580
.3430	.30344 +	.121	.62656 —	.6570
.3440	.30465 +	.121	.62535 —	.6560
.3450	.30586 +	.121	.62414 —	.6550
.3460	.30707 +	.121	.62293 —	.6540
.3470	.30828 +	.121	.62172 —	.6530
.3480	.30949 —	.121	.62051 +	.6520
.3490	.31070 —	.121	.61930 +	.6510
.3500	.31191 —	.122	.61809 +	.6500
.3510	.31313 —	.122	.61687 +	.6490
.3520	.31435 +	.122	.61565 —	.6480
.3530	.31557 +	.121	.61443 —	.6470
.3540	.31678 —	.122	.61322 +	.6460
.3550	.31800 —	.122	.61200 +	.6450
.3560	.31922 —	.122	.61078 +	.6440
.3570	.32044 —	.122	.60956 +	.6430
.3580	.32166 —	.122	.60834 +	.6420
.3590	.32288 —	.122	.60712 +	.6410
.3600	.32410 —	.123	.60590 +	.6400

Sylvant Hantz his Table of *Area's of Segments of a Circle*, whose *Diameter* is supposed to be divided by the *Chord-lines* into 10000 equal parts, and the *Area* of the whole Circle Unity, or 100000 other parts.

Verf. Sine.	Segment.	Dif.	Segment.	Verf. Sine.
.3610	.32513		.67467	
.3620	.32655	.122	.67345	.6390
.3630	.32777	.122	.67223	.6380
.3640	.32900	.123	.67100	.6370
.3650	.33023	.123	.66977	.6360
		.123		.6350
.3660	.33146		.66854	
.3670	.33269	.123	.66931	.6340
.3680	.33392	.123	.66608	.6330
.3690	.33515	.123	.66485	.6320
.3700	.33637	.122	.66363	.6310
		.122		.6300
.3710	.33759		.66241	
.3720	.33882	.123	.66118	.6290
.3730	.34005	.123	.65995	.6280
.3740	.34128	.123	.65872	.6270
.3750	.34251	.123	.65749	.6260
		.124		.6250
.3760	.34375		.65625	
.3770	.34499	.124	.65501	.6240
.3780	.34623	.124	.65377	.6230
.3790	.34746	.123	.65254	.6220
.3800	.34869	.123	.65131	.6210
		.124		.6200

A
TABLE
OF

Logarithm Numbers,

From One to Ten Thousand :

WHEREBY

The Logarithm of any Number
under 100000. may be readily
discovered.



L O N D O N,
Printed for Nat. Ponder Anno Dom.
M D C L X X I I I.

A
TABLE

OF

LOCATIONS

FROM

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N	Log.	N	Log.	N	Log.
1	0.000000	34	1.531479	67	1.826075
2	0.301030	35	1.544068	68	1.832509
3	0.477121	36	1.556303	69	1.838849
4	0.602060	37	1.568202	70	1.845098
5	0.698970	38	1.579783	71	1.851258
6	0.778151	39	1.591064	72	1.857332
7	0.845098	40	1.602060	73	1.863323
8	0.903090	41	1.612784	74	1.869232
9	0.954242	42	1.623249	75	1.875061
10	1.000000	43	1.633468	76	1.880813
11	1.041393	44	1.643452	77	1.886491
12	1.079181	45	1.653213	78	1.892094
13	1.113943	46	1.662758	79	1.897627
14	1.146128	47	1.672098	80	1.903030
15	1.176091	48	1.681241	81	1.908485
16	1.204120	49	1.690196	82	1.913814
17	1.220449	50	1.698970	83	1.919078
18	1.255272	51	1.707570	84	1.924279
19	1.278753	52	1.716003	85	1.929419
20	1.301030	53	1.724276	86	1.934498
21	1.322219	54	1.732394	87	1.939519
22	1.342422	55	1.740362	88	1.944482
23	1.361728	56	1.748188	89	1.949390
24	1.380211	57	1.755875	90	1.954242
25	1.397940	58	1.763428	91	1.959041
26	1.414973	59	1.770852	92	1.963788
27	1.431304	60	1.778151	93	1.968483
28	1.447158	61	1.785330	94	1.973128
29	1.462398	62	1.792391	95	1.977723
30	1.477121	63	1.799340	96	1.982271
31	1.491361	64	1.806180	97	1.986772
32	1.505150	65	1.812913	98	1.991226
33	1.518514	66	1.819544	99	1.995625

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N	0	1	2	3	4
100	000000	000434	000868	001301	001734
101	004321	004751	005181	005609	006038
102	008600	009026	009451	009876	010299
103	012837	013259	013679	014100	014521
104	017033	017451	017868	018284	018700
105	021189	021603	022016	022428	022841
106	025306	025715	026125	026533	026942
107	029384	029789	030195	030599	031004
108	033424	033826	034227	034628	035029
109	037426	037825	038223	038620	039017
110	041393	041787	042182	042576	042969
111	045323	045714	046105	046495	046885
112	049218	049606	049993	050379	050766
113	053078	053463	053846	054229	054613
114	056905	057286	057666	058046	058426
115	060698	061075	061452	061829	062206
116	064458	064832	065206	065579	065953
117	068186	068557	068928	069298	069668
118	071882	072249	072617	072985	073352
119	075547	075912	076276	076640	077004
120	079181	079543	079904	080266	080626
121	082785	083144	083503	083861	084219
122	086359	086716	087071	087426	087781
123	089905	090258	090610	090963	091315
124	093422	093772	094122	094471	094820
125	096910	097257	097604	097951	098298
126	100371	100715	101059	101403	101747
127	103804	104146	104487	104828	105169
128	107209	107549	107888	108227	108565
129	110589	110926	111263	111599	111934

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	5	6	7	8	9	D
34	002166	002598	003029	003461	003891	432
38	006466	006894	007321	007748	008174	428
99	010724	011147	011570	011993	012415	424
21	014940	015359	015779	016197	016616	419
00	019116	019532	019947	020361	020775	416
41	023252	023664	024075	024486	024896	412
42	027349	027757	028164	028571	028978	408
04	031408	031812	032216	032619	033021	404
29	035429	035829	036229	036629	037028	400
17	039414	039811	040207	040602	040998	396
69	043362	043755	044148	044539	044932	393
85	047275	047664	048053	048442	048830	389
66	051153	051538	051924	052309	052694	386
13	054996	055378	055760	056142	056524	382
26	058805	059185	059563	059942	060320	379
06	062582	062958	063333	063709	064082	376
53	066326	066699	067071	067443	067815	372
88	070038	070407	070776	071145	071514	369
52	073718	074085	074451	074816	075182	366
04	077368	077731	078094	078457	078819	363
26	080987	081347	081707	082067	082426	360
19	084576	084934	085291	085647	086004	357
81	088136	088490	088845	089198	089552	355
15	091667	092018	092369	092721	093071	351
20	095169	095518	095866	096215	096562	349
98	098644	098989	099335	099681	100026	346
47	102091	102434	102777	103119	103462	343
69	105510	105851	106191	106531	106871	340
65	108903	109241	109579	109916	110253	338
34	112269	112605	112939	113275	113609	335

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N	0	1	2	3	4
130	113943	114277	114611	114944	115278
131	117271	117603	117934	118265	118595
132	120574	120903	121231	121559	121888
133	123852	124178	124504	124830	125156
134	127105	127429	127753	128076	128399
135	130334	130655	130977	131298	131619
136	133539	133858	134177	134496	134814
137	136721	137037	137354	137671	137987
138	139879	140194	140508	140822	141136
139	133015	143327	143639	143951	147463
140	146128	146438	146748	147058	147367
141	149219	149527	149835	150142	150449
142	152288	152594	152899	153205	153509
143	155336	155639	155943	156246	156549
144	158362	158664	158965	159266	159567
145	161368	161667	161967	162266	162564
146	164353	164650	164947	165244	165541
147	167317	167613	167908	168203	168497
148	170262	170555	170848	171141	171434
149	173186	173478	173769	174059	174351
150	176091	176381	176669	176959	177248
151	178977	179264	179552	179839	180126
152	181844	182129	182415	182699	182985
153	184691	184975	185258	185542	185825
154	187521	187803	188084	188366	188647
155	190332	190612	190892	191171	191451
156	193125	193403	193681	193959	194237
157	195895	196176	196453	196729	197005
158	198657	198932	199206	199481	199755
159	201397	201670	201943	202216	202488

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5	6	7	8	9	D
115611	115943	116276	116608	116939	333
118926	119256	119586	119915	120245	330
122216	122544	122871	123198	123525	328
125481	125806	126131	126456	126781	325
128722	129048	129368	129689	130012	323
131939	135259	132579	132899	133219	321
135133	139451	135769	136086	136403	318
138303	138618	138934	139249	139564	315
141449	145763	142076	142389	142702	314
144574	144885	145196	145507	145818	311
147676	147985	148294	148603	148911	309
150756	151063	151369	151676	151982	307
153815	154119	154423	154728	155032	305
156852	157154	157457	157759	158061	303
159868	160168	160469	160769	161068	301
162863	163161	163459	163758	164055	299
165838	166134	166430	166726	167022	297
168792	169086	169380	169674	169968	295
171726	172019	172311	172603	172895	293
174641	174932	175222	175512	175802	291
177536	177825	178113	178401	178689	289
180413	180699	180986	181272	181558	287
183269	183555	183839	184123	184407	285
186108	186391	186674	186956	187239	283
188928	189209	189490	189771	190051	281
191730	192009	192289	192567	192846	279
194514	194792	195069	195346	195623	278
197281	197556	197832	198107	198382	276
200029	200303	200577	200850	201124	274
201761	203033	203303	203577	203848	272

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N	0	1	2	3	4
160	204119	204391	204663	204934	205204
161	206826	207096	207365	207634	207904
162	209515	209783	210051	210319	210586
163	212187	212454	212720	212986	213252
164	214844	215109	215373	215638	215902
165	217484	217747	218010	218273	218536
166	220108	220369	220631	220892	221153
167	222716	222976	223236	223496	223755
168	225309	225568	225826	226084	226342
169	227887	228142	228400	228657	228913
170	230449	230704	230959	231215	231469
171	232996	233250	233504	233757	234011
172	235528	235781	236033	236285	236537
173	238046	238297	238548	238799	239049
174	240549	240799	241048	241297	241546
175	243038	243286	243534	243782	244029
176	245513	245759	246006	246252	246499
177	247973	248219	248464	248709	248954
178	250420	250664	250908	251151	251395
179	252853	253096	253334	253580	253822
180	255273	255514	255755	255996	256237
181	257679	257918	258158	258398	258637
182	260071	260309	260548	260787	261025
183	262451	262688	262925	263162	263399
184	264818	265054	265289	265525	265761
185	267172	267406	267641	267875	268109
186	269513	269746	269979	270213	270446
187	271842	272074	272306	272538	272769
188	274158	274389	274619	274850	275081
189	276462	276692	276921	277151	277379

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5	6	7	8	9	D
205475	205746	206016	206286	206556	272
208173	208441	208710	208978	209247	269
210853	211121	211388	211654	211921	267
213518	213783	214049	214314	214579	266
216166	216429	216694	216957	217221	264
218798	219060	219323	219585	219846	262
221414	221675	221936	222196	222456	261
224015	224274	224533	224791	225051	259
226599	226858	227115	227372	227629	258
229169	229426	229682	229938	230193	256
231724	231979	232234	232488	232742	254
234264	234517	234770	235023	235276	253
236789	237041	237292	237544	237795	252
239299	239549	239799	240049	240299	250
241795	242044	242293	242541	242789	249
244277	244525	244772	245019	245266	248
246745	246991	247237	247482	247728	246
249198	249443	249687	249932	250176	245
251638	251881	252125	252368	252610	243
254064	254306	254548	254789	255031	242
256477	256718	256958	257198	257438	241
258877	259116	259355	259594	259833	239
261263	261501	261739	261976	262214	238
263636	263873	264109	264346	264582	237
265996	26632	266467	266702	266937	235
268344	268578	268812	269046	269279	234
270679	270912	271144	271377	271609	233
273001	273233	273464	273696	273927	232
275310	275542	275772	276002	276232	230
277609	277838	278067	278296	278525	229

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N	0	1	2	3	4
190	278754	278982	279211	279439	279667
191	281033	281261	281488	281714	281942
192	283301	283527	283753	283979	284205
193	285557	285782	286007	286232	286456
194	287802	288026	288249	288473	288695
195	290035	290257	290479	290702	290925
196	292256	292478	292699	292920	293142
197	294466	294687	294907	295127	295347
198	296665	296884	297104	297323	297542
199	298853	299071	299289	299507	299725
200	301029	301247	301464	301681	301898
201	303196	303412	303628	303844	304059
202	305351	305566	305781	305996	306211
203	307456	307709	307924	308137	308351
204	309630	309843	300056	310268	310481
205	311754	311966	312177	312389	312600
206	313867	314078	314289	314499	314709
207	315970	316180	316389	316599	316809
208	318063	318272	318481	318689	318898
209	320146	320354	320562	320769	320977
210	322216	322426	322633	322839	323046
211	324288	324488	324694	324899	325105
212	326336	326541	326745	326949	327155
213	328379	328583	328787	328991	329194
214	330414	330617	330819	331022	331225
215	332438	332640	332846	333044	333246
216	334454	334655	334857	335057	335257
217	336459	336659	336859	337059	337259
218	338456	338656	338853	339054	339253
219	340444	340642	340841	341039	341237

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5	6	7	8	9	D
279895	280123	280351	280578	280806	228
282169	282396	282622	282849	283075	227
284431	284656	284882	285107	285332	226
286681	286905	287129	287354	287578	225
288919	289143	289366	289589	289812	223
291147	291369	291591	291813	292034	222
293362	293584	293804	294025	294246	221
295567	295787	296007	296226	296446	220
297761	297979	298198	298416	298635	219
299943	300161	300378	300595	300813	218
302114	302331	302547	302764	302979	217
304275	304491	304706	304921	305136	216
306425	306639	306854	307068	307282	215
308564	308778	308998	309204	309417	213
300693	310906	311118	311329	311542	212
312812	313023	313234	313445	313659	211
314920	315130	315340	315551	315760	210
317018	317227	317436	317646	317854	209
319106	319314	319522	319730	319938	208
321184	321391	321598	321805	322012	207
323252	323458	323665	323871	324077	206
325310	325516	325721	325926	326131	205
327359	327563	327767	327972	328176	204
329398	329601	329805	330008	330211	203
331427	331629	331832	332034	332236	202
333447	333649	333850	334051	334253	202
335458	335658	335859	336059	336259	201
337459	337659	337859	338058	338257	200
339451	339650	339849	340047	340246	299
341436	341632	341830	342028	342225	298

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N	0	1	2	3	4
220	342422	342620	342817	343014	343212
221	344392	344589	344785	344981	345178
222	346353	346549	346744	346939	347135
223	348305	348499	348694	348889	349083
224	350248	350442	350636	350829	351023
225	352183	352375	352568	352761	352954
226	354108	354301	354493	354685	354876
227	356026	356217	356408	356599	356790
228	357935	358125	358316	358506	358696
229	359835	360025	360215	360404	360593
230	361728	361917	362105	362294	362481
231	363612	363799	363988	364176	364363
232	365488	365675	365862	366049	366236
233	367356	367542	367729	367915	368101
234	369216	369401	369587	369772	369958
235	371068	371253	371437	371622	371806
236	372912	373096	373279	373464	373647
237	374748	374932	375115	375298	375481
238	376577	376759	376942	377124	377306
239	378398	378579	378761	378943	379124
240	380211	380392	380573	380754	380934
241	382017	382197	382377	382557	382737
242	383815	383995	384174	384353	384533
243	385606	385785	385964	386142	386321
244	387389	387568	387746	387923	388101
245	389166	389343	389520	389698	389875
246	390935	391112	391288	391464	391641
247	392697	392873	393048	393224	393399
248	394452	394627	394802	394977	395152
249	396199	396374	396548	396722	396896

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5	6	7	8	9	D
343409	343606	343802	343999	344196	197
345373	345569	345766	345962	346157	196
347330	347525	347720	347915	348110	195
349278	349472	349659	349860	350054	194
351216	351409	351603	351796	351989	193
353147	353339	353532	353724	353916	193
355068	355239	355452	355643	355834	192
356981	357172	357363	357554	357744	191
358886	359076	359266	359456	359646	190
360783	360972	361161	361350	361539	189
362671	362859	363048	363236	363424	188
364551	364739	364926	365113	365301	188
366423	366609	366796	366983	367169	187
368287	368473	368659	368845	369030	186
370143	370328	370513	370698	370882	185
371991	372175	372359	372544	372728	184
373831	374015	374198	374382	374565	184
375664	375846	376029	376212	376394	183
377488	377670	377852	378034	378216	182
379306	379487	379668	379849	380030	181
381115	381296	381476	381656	381837	181
382917	383097	383277	383456	383636	180
384712	384891	385069	385249	385428	179
386499	386677	386856	387034	387212	178
388279	388456	388634	388811	388989	178
390051	390228	390405	390582	390759	177
391817	391993	392169	392345	392521	176
393575	393751	393926	394101	394277	176
395326	395501	395676	395850	396025	175
397071	397245	397419	397592	397766	174

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N	0	1	2	3	4
250	397940	498114	398287	398461	398634
251	399674	499844	700019	400192	400365
252	401401	401573	401745	401917	402089
253	403121	403292	403464	403635	403806
254	404834	405005	405176	405346	405517
255	406540	406710	406881	407051	407221
256	408239	408409	408579	408749	408918
257	409933	410102	410271	410439	410609
258	411619	411788	411956	412124	412293
259	413299	413467	413635	413803	413969
260	414973	415140	415307	415474	415641
261	416641	416807	416973	417139	417306
262	418301	418467	418633	418798	418964
263	419956	420121	420286	420451	420616
264	421604	421768	421933	422097	422261
265	423246	423409	423574	423737	423901
266	424882	425045	425208	425371	425534
267	426511	426674	426836	426999	427161
268	428135	428297	428459	428621	428783
269	429752	429914	430075	430236	430398
270	431364	431525	431685	431846	432007
271	432969	433129	433289	433449	433609
272	434569	434729	434888	435048	435207
273	436163	436322	436481	436639	436799
274	437751	437909	438067	438226	438384
275	439333	439491	439648	439806	439964
276	440909	441066	441224	441381	441538
277	442479	442637	442797	442949	443106
278	444045	444201	444353	444513	444669
279	445604	445759	445915	446071	446226

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5	6	7	8	6	D
393808	398981	399154	399328	399501	173
400538	400711	400883	401056	401228	173
402261	402433	402605	402777	402949	172
403978	404149	404320	404492	404663	171
405688	405858	406029	406199	406369	171
407391	407561	407731	407901	408070	170
409087	409257	409426	409595	409764	169
410777	410946	411114	411283	411451	169
412461	412629	412796	412964	413132	168
414137	414305	414472	414639	414806	167
415808	415974	416141	416308	416474	167
417472	417638	417804	417969	418135	166
419129	419295	419460	419625	419791	165
420781	420945	421110	421275	421439	165
422426	422589	422754	422918	423082	164
424065	424228	424392	424555	424718	164
425697	425860	426023	426186	426349	163
427324	427486	427648	427811	427973	162
428944	429106	429268	429429	429591	162
430559	430719	430881	431042	431203	161
432167	432328	432488	432649	432809	161
433769	433929	434089	434249	434409	160
435366	435526	435685	435844	436004	159
436957	437116	437275	437433	437592	159
438542	438701	438859	439017	439175	158
440122	440279	440437	440594	440752	158
441695	441852	442009	442166	442323	157
443262	443419	443576	443732	443889	157
444385	444498	4445137	4445293	4445449	156
446382	446537	446652	446848	447003	155

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N	0	1	2	3	4
280	447158	447313	447468	447623	447778
281	448706	448861	449015	449169	449324
282	450249	450403	450557	450711	450865
283	451786	451939	452093	452247	452399
284	453318	453471	453624	453777	453929
285	454845	454997	455149	455302	455454
286	456366	456518	456669	456821	456973
287	457889	458033	458184	458336	458487
288	459392	459543	459694	459845	459995
289	460898	461048	461198	461348	461499
290	462398	462548	462697	462847	462997
291	463893	464042	464191	464340	464489
292	465383	465532	465680	465829	465977
293	466868	467016	467164	467312	467460
294	468347	468495	468643	468790	468938
295	469822	469969	470116	470263	470410
296	471292	471438	471585	471732	471878
297	472756	472903	473049	473195	473341
298	474216	474362	474508	474653	474799
299	475671	475816	475962	476107	476252
300	477121	477266	477411	477555	477699
301	478566	478711	478855	478999	479143
302	480007	480151	480294	480438	480582
303	481443	481586	481729	481872	482016
304	482874	483016	483159	483302	483445
305	484429	484442	484585	484727	484869
306	485721	485863	486005	486147	486289
307	487138	487279	487421	487563	487704
308	488551	488692	488833	488974	489114
309	489958	490090	490239	490379	490520

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5	6.	7	8	9	D
447932	448088	448242	448397	448552	155
449478	449633	449787	449941	450095	154
451018	451172	451326	451479	451633	154
452553	452706	452859	453012	453165	153
454082	454235	454387	454539	454692	153
455606	455758	455910	456062	456214	152
457125	457276	457428	457579	457731	152
458638	458789	458939	459091	459242	151
460146	460296	460447	460597	460748	151
461649	461799	461948	462098	462248	150
463146	463296	463445	463594	463744	150
464639	464788	464936	465085	465234	149
466126	466274	466423	466571	466719	149
467608	467756	467904	468052	468199	148
469086	469233	469380	469527	469675	147
470557	470704	470851	470998	471145	247
472025	472171	472318	472464	472610	186
473487	473633	473779	473925	474071	146
474944	475089	475235	475381	475526	146
476397	476542	476687	476833	476976	145
477844	477989	478133	478278	478422	145
479287	479431	479575	479719	479863	144
480725	480869	481012	481156	481299	144
482159	482302	482445	482588	482731	143
483587	483729	483872	484015	484157	143
485011	485153	485295	485437	485579	142
486430	486572	486714	486855	486997	142
487845	487986	488127	488269	488409	141
489255	489396	489537	489677	489818	141
490661	490801	490941	491081	491222	140

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N	0	1	2	3	4
310	491362	491502	491642	491782	491922
311	492760	492900	493039	493179	493319
312	494155	494294	494433	494572	494711
313	495544	495683	495822	495960	496099
314	496929	497068	497206	497344	497483
315	498311	498448	498586	498724	498862
316	499687	499824	499962	500099	500236
317	501059	501196	501333	501470	501607
318	502427	502564	502700	502837	502973
319	503791	503927	504063	504199	504335
320	505149	505286	505421	505557	505693
321	506505	506640	506776	506911	507046
322	507856	507991	508126	508260	508395
323	509203	509337	509471	509606	509740
324	510545	510679	510813	510947	511081
325	511883	511017	512151	512284	512418
326	513218	513351	513484	513617	513750
327	514548	514681	514813	514946	515079
328	515874	516006	516139	516271	516403
329	517196	517328	517459	517592	517724
330	518514	518646	518777	518909	519040
331	519828	519959	520090	520221	520353
332	521138	521269	521399	521530	521661
333	522444	522575	522705	522835	522966
334	523746	523876	524006	524136	524266
335	525045	525174	525304	525434	525563
336	526339	526469	526598	526727	526856
337	527629	527759	527888	528016	528145
338	528916	529045	529174	529301	529430
339	530199	530328	530456	530584	530712

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5	6	7	8	9	D
492062	492201	492341	492481	492621	140
493458	493597	493737	493876	494015	139
494850	494989	495128	495267	495406	139
496238	496376	496515	496653	496791	139
497621	497759	497897	498035	498173	138
498999	499137	499275	499412	499549	138
500374	500510	500648	500785	500922	137
501744	501880	502017	502154	502291	137
503109	503246	503382	503518	503655	136
504471	504607	504743	504878	505014	136
505828	505964	506099	506234	506369	136
507181	507316	507451	507586	507721	135
508529	508664	508799	508934	509068	135
509874	510009	510143	510277	510411	134
511215	511349	511482	511616	511749	134
512551	512684	512818	512951	513084	133
513883	514016	514149	514282	514415	133
515211	515344	515476	515609	515741	133
516535	516668	516799	516932	517064	132
517855	517987	518119	518251	518382	132
519171	519303	519434	519566	519697	131
520484	520615	520745	520876	521007	131
521792	521922	522053	522183	522314	131
523096	523226	523356	523486	523616	130
524396	524526	524656	524785	524915	130
525693	525822	525951	526081	526210	129
526985	527114	527243	527372	527501	129
528274	528402	528531	528659	528788	129
529559	529687	529815	529943	530072	128
530839	530968	531096	531223	531351	128

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N	0	1	2	3	4
340	531479	531607	531734	531862	531989
341	532754	532882	533009	533136	533264
342	534026	534153	534280	534407	534534
343	535294	535421	535547	535674	535800
344	536558	536685	536811	536937	537063
345	537819	537945	538071	538192	538322
346	539076	539202	539327	539452	539578
347	540329	540455	540579	540705	540829
348	541579	541704	541829	541953	542078
349	542825	542949	543074	543199	543323
350	544008	544192	544316	544440	544564
351	545307	545431	545555	545678	545802
352	546543	546666	546789	546913	547036
353	547775	547898	548021	548144	548265
354	549003	549126	549249	549371	549494
355	550228	550351	550773	550595	550717
356	551449	551572	551694	551816	551938
357	552668	552789	552911	553033	553155
358	553883	554004	554126	554247	554368
359	555094	555215	555336	555457	555578
360	556303	556423	556544	556664	556785
361	557507	557627	557748	557868	557988
362	558709	558829	558948	558068	559188
363	559907	560026	560146	560265	560385
364	561101	561221	561339	561459	561578
365	562293	562412	562531	562649	562769
366	563481	563599	563718	563837	563955
367	564666	564784	564903	565021	565139
368	565848	565966	566084	566202	566319
369	567026	567144	567262	567379	567497

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5	6	7	8	9	D
532117	532245	532372	532499	532627	128
533391	533518	533645	533772	533899	127
534661	534787	534914	535041	535167	127
535927	536053	536179	536304	536432	126
537189	537315	537441	537567	537693	126
538448	538574	538699	538825	538951	126
539703	539829	539954	540079	540204	125
540955	541079	541205	541329	541454	125
542203	542327	542452	542576	542701	125
543447	543571	543696	543819	543944	124
544688	544812	544934	545059	545183	124
545925	546049	546172	546296	546419	124
547159	547282	547405	547529	547651	123
548389	548512	548635	548758	548882	123
549616	549739	549861	549984	550106	123
550839	550962	551084	551206	551328	122
552059	552181	552303	552425	552547	122
553279	553398	553519	553640	553762	121
554489	554610	554731	554852	554973	121
555699	555819	555940	556061	556182	121
556905	557026	557146	557267	557387	120
558108	558228	558349	558469	558589	120
559308	559428	559548	559667	559787	120
560504	560624	560743	560863	560982	119
561698	561817	561936	562055	562174	119
562887	563006	563125	563244	563362	119
564074	564192	564311	564429	564548	119
565257	565376	565494	565612	565729	118
566437	566555	566673	566791	566909	118
567614	567732	567849	567967	568084	118

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N	0	1	2	3	4
370	568202	568319	568436	568554	568671
371	569374	569491	569608	569725	569842
372	570543	570659	570776	570893	571009
373	571709	571825	571942	572058	572174
374	572872	572988	573104	573219	573336
375	574031	574147	574263	574379	574494
376	575188	575303	575419	575534	575649
377	576341	576457	576572	576687	576802
378	577492	577607	577722	577836	577951
379	578639	578754	578868	578983	579097
380	579784	579898	580012	580126	580241
381	580925	581039	581153	581267	581381
382	582063	582177	582291	582404	582518
383	583199	583312	583426	583539	583652
384	584331	584444	584557	584670	584783
385	585461	585574	585686	585799	585912
386	586587	586699	586812	586925	587037
387	587711	587823	587935	588047	588159
388	588832	588944	589056	589167	589279
389	589949	590061	590173	590284	590396
390	591065	591176	591287	591399	591509
391	592177	592288	592399	592509	592621
392	593286	593397	593508	593618	593729
393	594393	594503	594614	594724	594834
394	595496	595606	595717	595827	595937
395	596597	596707	596817	596927	597037
396	597695	597805	597914	598024	598134
397	598790	598899	599009	599119	599228
398	599883	599992	600101	600210	600319
399	600973	601082	601191	601299	601408

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5	6	7	8	9	D
568788	568903	569023	569139	569257	117
569959	570076	570193	570309	570426	117
571126	571243	571359	571476	571592	117
572291	572407	572523	572639	572755	116
573452	573568	573684	573799	573915	116
574609	574726	574841	574957	575072	116
575765	575880	575996	576111	576226	115
576917	577032	577147	577262	577377	115
578066	578181	578295	578409	578525	115
579212	579326	579441	579555	579669	114
580355	580469	580583	580697	580811	114
581495	581608	581722	581835	581949	114
582631	582745	582858	582972	583085	114
583765	583879	583992	584105	584218	113
584896	585009	585122	585235	585348	113
586024	586137	586249	586362	586475	113
587149	587262	587374	587486	587599	112
588272	588384	588496	588608	588719	112
589391	589503	589615	589726	589838	112
590507	590619	590730	590842	590953	112
591621	591732	591843	591955	592066	111
592732	592843	592954	593064	593175	111
593839	593950	594061	594171	594282	111
594945	595055	595165	595275	595386	110
596047	596157	596267	596377	596487	110
597146	597256	597366	597476	597586	110
598243	598353	598462	598572	598681	110
599337	599446	599556	599665	599774	109
600428	600537	600646	600755	600864	109
601517	601625	601734	601843	601951	109

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N	0	1	2	3	4
400	602059	602169	602277	602386	602494
401	603144	603253	603361	603469	603577
402	604226	604334	604442	604550	604658
403	605305	605413	605521	605628	605736
404	606381	606489	606596	606704	606811
405	607455	607562	607669	607777	607884
406	608526	608633	608739	608847	608954
407	609594	609701	609808	609914	610021
408	610660	610767	610873	610979	611086
409	611723	611829	611936	611042	612148
410	612284	612889	612996	613102	613207
411	613842	613947	614053	614159	614264
412	614897	615003	615108	615213	615319
413	615950	616055	616160	616265	616370
414	617000	617105	617210	617315	617419
415	618048	618153	618257	618362	618466
416	619093	619198	619302	619406	619511
417	620136	620240	620344	620448	620552
418	621176	621280	621384	621448	621592
419	622214	622318	622421	622525	622628
420	623249	623353	623456	623559	623663
421	624282	624385	624488	624591	624695
422	625312	625415	625518	625621	625724
423	626340	626443	626546	626648	626751
424	627366	627468	627571	627673	627775
425	628389	628491	628593	628695	628797
426	629409	629512	629613	629715	629817
427	630428	630529	630631	630733	630835
428	631444	631545	631647	631748	631849
429	632457	632559	632656	632751	632862

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5	6	7	8	9	D
602603	602117	602819	602928	603036	108
603686	603794	603902	604009	604118	108
604766	604874	604982	605089	605197	108
605844	605951	606059	606166	606274	108
606919	607026	607133	607241	607348	107
607991	608098	608205	608312	608419	107
609061	609167	609274	609381	609488	107
610128	610234	610341	610447	610554	107
611192	611298	611405	611511	611617	106
612254	612359	612466	612572	612678	106
613313	613419	613525	613630	613736	106
614369	614475	614581	614686	614792	106
615424	615529	615634	615739	615845	105
616476	616581	616686	616790	616891	105
617525	617629	617734	617839	617943	105
618571	618676	618780	618884	618989	105
619615	619719	619824	619928	620032	104
620656	620760	620864	620968	621072	104
621695	621799	621902	622007	622110	104
622732	622835	622939	623042	623146	104
623766	623869	623973	624076	624179	103
624798	624901	625004	625107	625209	103
625827	625929	626032	626135	626237	103
626853	626956	627058	627161	627263	103
627878	627979	628082	628185	628287	102
628809	629002	629104	629206	629308	102
629919	630021	630123	630224	630326	102
630936	631038	631139	631241	631342	102
631951	632052	632153	632255	632356	101
632963	633064	633165	633266	633367	101

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N	0	1	2	3	4
430	633468	633559	633670	633771	633872
431	634477	634578	634679	634779	634880
432	635484	635584	635685	635785	635886
433	636488	636588	636688	636789	636889
434	637489	637589	637689	637789	637889
435	638489	638589	638689	638789	638888
436	639485	639586	639686	639785	639885
437	640481	640581	640680	640779	640879
438	641475	641573	641672	641771	641871
439	642465	642563	642662	642761	642860
440	643453	643551	643650	643749	643847
441	644439	644537	644636	644734	644832
442	645422	645521	645619	645717	645815
443	646404	646502	646599	646698	646796
444	647383	647481	647579	647676	647774
445	648360	648458	648555	648653	648750
446	649335	649432	649529	649627	649724
447	650308	650405	650502	650599	650696
448	651278	651375	651472	651569	651666
449	652246	652343	652439	652536	652633
450	653213	653309	653405	653502	653598
451	654177	654273	654369	654465	654562
452	655138	655235	655331	655427	655523
453	656098	656194	656289	656386	656482
454	657056	657152	657247	657343	657438
455	658011	658107	658202	658298	658393
456	658965	659060	659155	659250	659346
457	659916	660011	660106	660201	660296
458	660865	660960	661055	661149	661245
459	661813	661907	662002	662096	662191

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5	6	7	8	9	D
633973	634075	634075	634276	634376	100
634981	635081	635182	635283	635383	100
635986	636087	636187	636288	636388	100
636989	637089	637189	637289	637389	100
637989	638089	638189	638289	638389	99
638988	639088	639188	639287	639387	99
639984	640084	640183	640283	640382	99
640978	641077	641177	641276	641375	99
641969	642069	642168	642267	642366	99
642959	643058	643156	643255	643354	99
643946	644044	644143	644242	644340	98
644931	645029	645127	645226	645324	98
645913	646011	646109	646208	646306	98
646894	646992	647089	647187	647285	98
647872	647969	648067	648165	648262	98
648848	648945	649043	649140	649237	97
649821	649919	650016	650113	650210	97
650793	650890	650987	651084	651181	97
651762	651859	651956	652053	652149	97
652729	652826	652923	653019	653116	97
653695	653791	653888	653984	654080	96
654658	654754	654850	654946	655042	96
655619	655715	655810	655906	656002	96
656577	656673	656769	656864	656960	96
657534	657629	657725	657820	657916	96
658488	658584	658679	658774	658869	95
659441	659536	659630	659726	659821	95
660391	660486	660581	660676	660771	95
661339	661434	661529	661623	661718	95
662286	662380	662475	662569	662663	95

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N	0	1	2	3	4
460	662758	662852	662947	663041	663135
460	663701	663795	663889	663983	664078
462	664642	664736	664829	664924	665018
463	665581	665675	665769	665862	665956
464	666518	666611	666705	666799	666892
465	667453	667546	667639	667733	667826
466	668386	668479	668572	668665	668759
467	669317	669409	669503	669596	669689
468	670246	670339	670431	670524	670617
469	671173	671265	671358	671451	671543
460	672098	672190	672283	672375	672467
461	673021	673113	673205	673297	673389
462	673942	674034	674126	674218	674309
463	674861	674953	675045	675137	675228
464	675778	675869	675962	676053	676145
465	676694	676785	676876	676968	677059
466	677607	677698	677789	677881	677972
467	678518	678609	678700	678791	678882
468	679428	679519	679609	679700	679791
469	680336	680426	680517	680607	680698
480	681241	681332	681422	681513	681603
481	682145	682235	682326	682416	682506
482	683047	683137	683227	683317	683407
483	683947	674037	684127	684217	684307
484	684845	684935	685025	685114	685204
485	685742	685831	685921	686010	686099
486	686636	686726	686815	686904	686994
487	687529	687618	687707	687796	687885
488	688419	688509	688598	688687	688776
489	689309	689398	689486	689575	689664

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5	6	7	8	9	D
663229	663324	663418	663512	663607	94
664172	664266	664359	664454	664548	94
665112	665206	665299	665393	665487	94
666049	666143	666237	666331	666424	94
666986	667079	667173	667266	667359	64
667919	668013	668106	668199	668293	93
668852	668945	669038	669131	669224	93
669782	669875	669967	670060	670153	93
670709	670802	670895	670988	671080	93
671636	671728	671821	671913	672005	93
672559	672652	672744	672836	672929	92
673482	673574	673666	673758	673849	92
674402	674494	674586	674677	674769	92
675319	675412	675503	675595	675687	92
676236	676328	676419	676511	676602	92
677151	677242	677333	677424	677516	91
678063	678154	678245	678335	678427	91
678973	679064	679155	679246	679337	91
679882	679972	680063	680154	680245	91
680789	680879	680969	681060	681151	91
681693	681784	681874	681964	682055	90
682596	682686	682777	682867	682957	90
683497	683587	683677	683767	683857	90
684396	684486	684576	684666	684756	90
685294	685383	685473	685563	685652	90
686189	686279	686368	686458	686547	89
687083	687172	687261	687351	687439	89
687975	688064	688153	688242	688331	89
688865	688953	689042	689131	689220	89
689753	689841	689930	690019	690107	89

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N	0	1	2	3	4
490	690196	690285	690373	690462	690550
491	691081	691169	691258	691347	691435
492	691965	692053	692142	692229	692318
493	692847	692935	693023	693111	693199
494	693727	693815	693903	693991	694078
495	694605	694693	694781	694868	694956
496	695482	695569	695657	695744	695832
497	696356	696444	696531	696618	696706
498	697229	697317	697404	697491	697578
499	698101	698188	698275	698362	698449
500	698970	699057	699144	699231	699317
501	699838	699924	700011	700098	700184
502	700704	700790	700877	700963	701049
503	701568	701654	701741	701827	701913
504	702430	702517	702603	702689	702775
505	703291	703377	703463	703549	703635
506	704151	704236	704322	704408	704494
507	705008	705094	705179	705265	705350
508	705863	705949	706035	706120	706206
509	706718	706803	706888	706974	707059
510	707570	707655	707740	707826	707911
511	708421	708506	708591	708676	708761
512	709269	709355	709439	709524	709609
513	710117	710202	710287	710371	710456
514	710963	711048	711132	711217	711301
515	711807	711892	711976	712060	712144
516	712649	712734	712818	712902	712986
517	713491	713575	713659	713742	713826
518	714329	714414	714497	714581	714665
519	715167	715251	715335	715418	715501

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5	6	7	8	9	D
690639	690728	690816	690905	690993	89
691524	691612	691700	691789	691877	88
692406	692494	692583	692671	692759	88
693287	693375	693463	693551	693639	88
694166	694254	694342	694429	694517	88
695044	695131	695219	695307	695394	88
695919	696007	696094	696182	696269	87
696793	696880	696968	697055	697142	87
697665	697752	697839	697926	698014	87
698535	698622	698709	698796	698883	87
699404	699491	699578	699664	699751	87
700271	700358	700444	700531	700617	87
701136	701222	701309	701395	701482	86
701999	702086	702172	702258	702344	86
702861	702947	703033	703119	703205	86
703721	703807	703893	703979	704065	86
704579	704665	704751	704837	704922	86
705436	705522	705607	705693	705778	86
706291	706376	706462	706547	706632	85
707144	707219	707315	707399	707485	85
707996	708081	708166	708251	708336	85
708846	708931	709015	709100	709185	85
709694	709779	709863	709948	710033	85
710540	710625	710709	710794	710879	85
711385	711469	711554	711639	711723	84
712229	712313	712397	712481	712566	84
713070	713154	713238	713223	713407	84
713910	713994	714078	714162	714246	84
714749	714833	714916	714999	715084	84
715586	715669	715753	715836	715919	84

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N	0	1	2	3	4
520	716003	716087	716170	716254	716337
521	716838	716921	717004	717088	717171
522	717671	717754	717837	717920	718003
523	718502	718585	718668	718751	718834
524	719331	719414	719497	719579	719663
525	720159	720242	720325	720407	720490
526	720986	721068	721151	721233	721316
527	721811	721893	721975	722058	722140
528	722634	722716	722798	722881	722964
529	723456	723538	723619	723702	723783
530	724276	724358	724439	724522	724604
531	725095	725176	725258	725339	725422
532	725912	725993	726075	726156	726238
533	726727	726809	726890	726972	727053
534	727541	727623	727704	727785	727866
535	728354	728435	728516	728597	728678
536	729165	729246	729327	729408	729489
537	729974	730055	730136	730217	730298
538	730782	730863	730944	731024	731105
539	731589	731669	731749	731830	731911
540	732394	732474	732555	732635	732715
541	733197	733278	733358	733438	733518
542	733999	734079	734159	734239	734319
543	734799	734879	734959	735039	735119
544	735599	735679	735759	735838	735918
545	736397	736476	736556	736635	736715
546	737192	737272	737352	737431	737511
547	737987	738067	738146	738225	738305
548	738781	738859	738939	739018	739097
549	739572	739651	739731	739809	739889

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5	6	7	8	9	D
716421	716504	716588	716671	716754	83
717254	717338	717421	717504	717587	83
718086	718169	718253	718336	718419	83
718917	718999	719083	719165	719248	83
719745	719828	719911	719994	720077	83
720573	720655	720738	720821	720903	83
721398	721481	721563	721646	721728	82
722222	722305	722387	722469	722552	82
723045	723127	723209	723291	723374	82
723866	723948	724029	724112	724194	82
724685	724767	724849	724931	725013	82
725503	725585	725667	725748	725829	82
726319	726401	726483	726564	726646	82
727134	727216	727297	727379	727459	81
727948	728029	728110	728191	728273	81
728759	728841	728922	729003	729084	81
729569	729651	729732	729813	729893	81
730378	730459	730540	730621	730702	81
731186	731266	731347	731428	731508	81
731991	732072	732152	732233	732313	81
732796	732876	732956	733037	733117	80
733598	733679	733759	733839	733919	80
734399	734479	734559	734639	734719	80
735199	735279	735359	735439	735519	80
735998	736078	736157	736237	736317	80
736795	736874	736954	737034	737113	80
737590	737669	737749	737829	737908	79
738384	738463	738543	738622	738701	79
739177	739256	739335	739414	739493	79
739968	740047	740126	740205	740284	79

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N	0	1	2	3	4
550	740363	740442	740521	740599	740678
551	741152	741230	741309	741388	741467
552	741939	742018	742096	742175	742254
553	742725	742802	742882	742961	743039
554	743509	743588	743667	743745	743823
555	744293	744371	744449	744528	744606
556	745075	745153	745231	745309	745387
557	745855	745933	746011	746089	746167
558	746634	746712	746789	746868	746945
559	747412	747489	747567	747645	747722
560	748188	748266	748343	748421	748498
561	748963	749040	749118	749195	749272
562	749736	749814	749891	749968	750045
563	750508	750586	750663	750739	750817
564	751279	751356	751433	751510	751587
565	752048	752125	752202	752279	752356
566	752816	752893	752969	753047	753123
567	753583	753659	753736	753813	753889
568	754348	754425	754501	754578	754654
569	755112	755189	755265	755341	755417
570	755875	755951	756027	756103	756179
571	756636	756712	756788	756864	756940
572	757396	757472	757548	757627	757699
573	758155	758230	758306	758382	758458
574	758918	758988	759063	759139	759214
575	759668	759743	759819	759894	759966
576	760422	760498	760573	760649	760722
577	761176	761251	761326	761402	761477
578	761928	762003	762078	762153	762228
579	762679	762754	762829	762904	762978

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5	6	7	8	9	D
740757	740830	740915	740994	741073	79
741546	741624	741703	741782	741860	79
742332	742411	742489	742568	742647	79
743118	743196	743235	743353	743481	78
743902	743979	744058	744136	744215	78
744684	744762	744840	744919	744997	78
745465	745543	745621	745699	745777	78
746245	746323	746401	746479	746556	78
747022	747103	747170	747256	747334	78
747800	747878	747955	748033	748110	78
748576	748653	748731	748808	748885	77
749349	749427	749504	749582	749659	77
750123	750199	750277	750354	750431	77
750894	750971	751048	751125	751203	77
751664	751741	751818	751895	751972	77
752433	752509	752586	752663	752739	77
753199	753277	753353	753429	753506	77
753366	754042	754119	754195	754272	77
754736	754807	754883	754959	755036	76
755494	755569	755646	755722	755799	76
756256	756332	756408	756484	756560	76
757016	757092	757168	757244	757320	76
757775	757851	757927	758003	758079	76
758533	758609	758685	758761	758836	76
759290	759366	759441	759517	759592	76
760045	760121	760196	760272	760347	75
760799	760875	760949	761025	761101	75
761552	761627	761702	761778	761853	75
762303	762378	762453	762529	762604	75
763053	763128	763203	763279	763353	75

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N	0	1	2	3	4
580	763428	763503	763578	763653	763727
581	764176	764251	764326	764400	764475
582	764923	764998	765072	765147	765221
583	765669	765743	765818	765892	765966
584	766413	766487	766562	766636	766710
585	767156	767230	767304	767379	767453
586	767898	767972	768046	768119	768194
587	768638	768712	768786	768860	768934
588	769377	769451	769525	769599	769673
589	770115	770189	770263	770336	770410
590	770852	770926	770999	771073	771146
591	771587	771661	771734	771808	771881
592	772322	772395	772468	772542	772615
593	773055	773128	773201	773274	773348
594	773786	773859	773933	774006	774079
595	774517	774589	774663	774736	774809
596	775246	775319	775392	775465	775538
597	775974	776047	776119	776193	776265
598	776701	776774	776846	776919	776992
599	777427	777499	777572	777644	777717
600	778151	778224	778296	778368	778441
601	778874	778947	779019	779091	779163
602	779596	779669	779741	779813	779885
603	780317	780389	780461	780533	780605
604	781037	781109	781181	781253	781324
605	781755	781827	781899	781971	782043
606	782473	782544	782616	782688	782759
607	783189	783260	783332	783403	783475
608	783904	783975	784046	784118	784189
609	784617	784689	784759	784831	784902

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5	6	7	8	9	D
763802	763877	763952	764023	764101	75
764549	764624	764699	764774	764848	75
765296	765370	765445	7655 9	765594	75
766041	766115	766189	766264	766308	74
766785	766859	766933	767007	767082	74
767527	767601	767675	767749	767823	74
768268	768342	768416	768490	768564	74
769008	769082	769156	769229	769303	74
769746	769820	769894	769968	770042	74
770484	770557	770631	770705	770778	74
771219	771293	771367	771440	771514	74
771955	772028	772102	772175	772248	73
772688	772762	772835	772908	772981	73
773421	773494	773567	773640	773713	73
774152	774225	774298	774371	774444	73
774882	774955	775028	775100	775173	73
775610	775683	775756	775829	775902	73
776338	776411	776483	776556	776629	73
777054	777137	777208	777292	777354	73
777789	777862	777934	778006	778079	72
778513	778585	778658	778729	778802	72
779236	779308	779380	779452	779524	72
779957	780029	780101	780173	780245	72
780677	780749	780821	780893	780965	72
781396	781468	781539	781612	781684	72
782114	782186	782258	782329	782401	72
782831	782902	782974	783046	783117	72
783546	783618	783689	783761	783832	71
784261	784332	784403	784475	784546	71
784974	785047	785116	785187	785259	71

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N	0	1	2	3	4
610	785329	785401	785472	785543	785615
611	786041	786112	786183	786254	786325
612	785751	786822	786893	786964	787035
614	788460	787731	787602	787673	787744
615	788164	788239	788309	788381	788451
615	788875	788946	789016	789087	789157
616	789581	789651	789722	789792	789863
617	790285	790356	790426	790496	790567
618	790989	791059	791129	791199	791269
619	791691	791761	791831	791901	791971
620	792392	792462	792532	792602	792672
621	793092	793162	793231	793301	793371
622	793791	793860	793930	793999	794069
623	794488	794558	794627	794697	794767
624	795185	795254	795324	795393	795463
925	795880	795949	796019	796088	796158
626	796574	796644	796713	796782	796852
627	797268	797337	797406	797475	797545
628	797959	798029	798098	798167	798236
629	798651	798719	798789	798858	798927
630	799341	799409	799478	799547	799616
631	800029	800098	800167	800236	800305
632	800716	800786	800854	800923	800992
633	801404	801472	801541	801609	801678
634	802089	802158	802226	802295	802363
635	802774	802842	802910	802979	803047
636	803457	803525	803594	803662	803730
637	804139	804208	804276	804344	804412
638	804821	804889	804957	805025	805093
639	805501	805569	805637	805705	805773

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5	6	7	8	9	D
785686	785757	785828	785899	785970	71
786396	786467	786538	786609	786680	71
787106	787177	787248	787319	787389	71
787815	787885	787956	788027	788098	71
788522	788593	788643	788734	788804	71
789228	789299	789369	789439	789510	71
789933	790004	790074	790144	790215	70
790637	790707	790778	790848	790918	70
791339	791409	791480	791550	791620	70
792041	792111	792181	792252	792322	70
792742	792812	792882	792952	793022	70
793441	793511	793581	793651	793721	70
794139	794209	794279	794349	794418	70
794836	794906	794976	795045	795115	70
795532	795602	795672	795741	795810	70
796227	796297	796366	796436	796505	69
796921	796990	797059	797129	797198	69
797614	797683	797752	797821	797890	69
798305	798374	798443	798513	798582	69
798996	799065	799134	799203	799272	69
799685	799754	799823	799892	799961	69
800373	800442	800511	800579	800648	69
801061	801129	801198	801266	801335	69
801747	801815	801884	801952	802021	69
802432	802500	802568	802637	802705	68
803116	803184	803252	803321	803389	68
803798	803867	803935	804003	804071	68
804480	804548	804616	804685	804753	68
805161	805229	805297	805365	805433	68
805841	805908	805976	806044	806112	68

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N	0	1	2	3	4
640	806179	806234	806316	806384	806451
641	806858	806926	806994	807061	807129
642	807535	807603	807670	807738	807806
643	808211	808279	808346	808414	808481
644	808886	808953	809021	809088	809156
645	809559	809627	809694	809762	809829
646	810233	810299	810367	810434	810501
647	810904	810971	811039	811106	811173
648	811575	811642	811709	811776	811843
649	812245	812312	812379	812445	812512
650	812913	812980	813047	813114	813181
651	813581	813648	813714	813781	813848
652	814248	814314	814381	814447	814514
653	814913	814979	815046	815113	815129
654	815578	815644	815711	815777	815843
655	816241	816308	816374	816440	816506
656	816904	816910	817036	817102	817169
657	817565	817631	817698	817764	817829
658	818226	818292	818358	818424	818489
659	818885	818951	819017	819083	819149
660	819543	819609	819676	819741	819807
661	820201	820267	820333	820399	820464
662	820858	820924	820989	821055	821120
663	821514	821509	821645	821709	821775
664	822168	822233	822299	822364	822429
665	822822	822887	822952	823018	823083
666	823474	823539	823605	823669	823735
667	824126	824191	824256	824321	824386
668	824776	824841	824906	824971	825036
669	825426	825491	825556	825621	825686

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5	6	7	8	9	D
806519	806587	806655	806723	806790	68
807197	807264	807332	807399	807497	68
807873	807941	808000	808076	808143	68
808549	808616	808684	808751	808818	67
809223	809290	809358	809425	809492	67
809896	809964	810031	810098	810165	67
810569	810636	810703	810770	810837	67
811239	811307	811374	811441	811508	67
811909	811977	812044	812111	812178	67
812579	812646	812713	812779	812847	67
813247	813314	813381	813448	813514	67
813914	813981	814048	814114	814181	67
814581	814647	814714	814780	814847	67
815246	815312	815378	815445	815511	66
815909	815976	816042	816109	816175	66
816573	816639	816705	816771	816838	66
817235	817301	817367	817433	817499	66
817899	817962	818028	818094	818159	66
818556	818622	818688	818754	818819	66
819215	819281	819346	819412	819478	66
819873	819939	820004	820070	820136	96
820529	820595	820661	820727	820792	66
821186	821251	821317	821382	821448	66
821841	821906	821932	822037	822103	65
822495	822560	822626	822691	822756	65
823148	823213	823279	823344	823409	65
823800	823865	823930	823995	824061	65
824451	824515	824581	824645	824711	65
825101	825166	825231	825295	825391	65
825751	825815	825880	825945	826009	65

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N	0	1	2	3	4
670	826075	826139	826207	826269	826334
671	826723	826787	826852	826917	826981
672	827365	827434	827499	827563	827628
673	828015	828079	828144	828207	828273
674	828659	828724	828789	828853	828918
675	829304	829368	829432	829497	829561
676	826947	830011	830075	830139	830604
677	830589	830653	830717	830781	830845
678	831229	831294	831358	831422	831486
679	831869	831934	831998	832062	832126
680	832579	832573	822637	832700	832764
681	833147	833211	833275	833339	833402
682	833784	833848	833912	833975	834939
683	834421	834484	834548	834611	834675
684	835056	835119	835183	835247	833510
685	835691	835754	835817	835881	835944
686	836324	836387	836451	836514	836577
687	836957	837019	837083	837146	837209
688	837588	837652	837715	837777	837841
689	838216	838282	838345	838408	838471
690	838849	838912	838975	839038	839101
691	836478	839541	839604	839667	839829
692	840106	840169	840232	840394	840357
693	840733	840796	840859	840921	840984
694	841359	841423	841485	841547	841609
695	841985	842047	842109	842172	842235
696	842609	842672	842734	842796	842959
697	843233	843295	843357	843419	843482
698	843855	843918	843979	844042	844104
699	844477	844539	844601	844664	844726

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5	6	7	8	9	D
826399	826464	826528	826593	826658	65
827046	827111	827175	827239	827305	65
827692	827757	827822	827886	827951	65
828338	828402	828467	828531	828595	64
828982	829046	829111	829175	829239	64
829225	829689	829754	829818	829882	64
830258	830332	830396	830460	830525	64
830909	830973	831037	831102	831166	64
831549	831614	831678	831742	831806	64
832189	832253	832317	832381	832445	64
832828	832892	832956	833019	833683	64
833466	833529	833593	833657	833721	64
834103	834166	834229	834294	834357	64
834739	834802	834866	834929	834993	64
835373	835437	835500	835564	835627	63
836007	836071	836134	836197	836271	63
836641	836704	836767	836830	836894	63
837273	837336	837399	837462	837525	63
837904	837967	838030	838093	838156	63
838534	838597	838660	838723	838786	63
839164	839227	839289	839352	839415	63
839792	839855	839918	839981	840043	63
840419	840482	840545	840608	840671	63
841049	841109	841172	841234	841297	63
841672	841735	841797	841859	841922	63
842297	842359	842432	842484	842547	62
842921	842983	843046	843108	843170	62
843544	843606	843669	843731	843793	62
844166	844229	844291	844353	844415	62
844788	844849	844912	844974	845036	62

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N	0	1	2	3	4
700	845098	845160	845222	845284	845346
701	845718	845779	845842	845904	845966
702	846337	846399	846461	846523	846585
703	846955	847017	847069	847141	847202
704	847573	847634	847696	847758	847819
705	848189	848251	848312	848374	848435
706	848105	848866	848928	841989	849051
707	849419	849481	849542	849604	849695
708	850033	850095	850156	850217	850279
709	850646	850707	850769	850829	850891
710	851258	851319	851381	851442	851503
711	851869	851931	851992	852053	852114
712	852479	852541	852602	852663	852724
713	853089	853150	853211	853272	853338
714	853698	853759	853819	853881	853941
715	854306	854367	854428	854488	854549
716	854913	854974	855034	855095	855156
717	855519	855579	855640	855701	855761
718	856124	856185	856245	856306	856366
719	856729	856789	856849	856910	856970
720	857332	857393	857453	857513	857574
721	857935	857995	858056	858116	858176
722	858537	858597	858657	858718	858778
723	859138	859198	859258	859318	859379
724	859739	859800	859859	859918	859978
725	860338	860399	860458	860518	860578
726	860937	860996	861056	861116	861176
727	861534	861594	861654	861714	861773
728	862131	862191	862251	862310	862369
729	862728	862787	862847	862906	862966

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5	6	7	8	9	D
845408	845470	845532	845594	845656	62
846028	846089	846151	846213	846275	62
846646	846708	846769	846832	846894	62
847264	847326	847388	847449	847511	62
847881	847943	848004	848067	848128	62
848497	848559	848620	848682	848743	62
849112	849174	849235	849297	849358	61
849726	849788	849849	849911	849972	61
850339	850401	850462	850524	850585	61
850952	851014	851075	851136	851197	61
851564	851625	851686	851747	851809	61
852175	852236	852297	852358	852419	61
852785	852846	852907	852968	853029	61
853394	853455	853516	853577	853637	61
854002	854063	854124	854185	854245	61
854609	854670	854731	854792	854852	61
855216	855277	855337	855398	855459	61
855822	855882	855943	856003	856054	61
856427	856487	856548	856608	856668	60
857031	857091	857152	857212	857272	60
857834	857894	857955	858015	858075	60
858236	858297	858357	858417	858477	60
858838	858898	858958	859018	859078	60
859439	859499	859559	859619	859679	60
860038	860098	860158	860218	860278	60
860837	860897	860957	861017	861077	60
861236	861295	861355	861415	861475	60
861833	861893	861952	862012	862072	60
862429	862489	862549	862608	862668	60
863025	863085	863144	863204	863263	60

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N	0	1	2	3	4
730	863323	893382	863442	863501	863561
731	863914	863977	864030	864096	864155
732	864511	894570	864629	864689	864748
733	865107	865163	865222	865282	865341
734	865796	865755	865814	865874	855933
735	866287	866346	866405	866465	866524
736	866878	866937	866996	867055	867114
737	867467	867526	867585	867644	867703
738	868056	868115	868174	868233	868292
739	868643	868703	868762	868821	868879
740	899232	869290	869349	869408	869466
741	869818	869877	869935	869994	870053
742	870404	870462	870521	870579	870638
743	870989	871047	871106	871164	871223
744	871573	871631	871689	871748	871806
745	872156	872215	872273	872331	872389
746	872739	872767	872855	872913	872971
747	873321	873379	873437	873495	873553
748	873902	873959	874018	874076	874134
749	874482	874539	874598	874656	874714
750	875061	875119	875177	875235	875293
751	875639	875698	875756	875813	875871
752	876218	876276	876333	876391	876449
753	876795	876853	876910	876968	837026
754	877371	877429	877487	877544	877602
755	877947	878004	878062	878119	878177
756	878522	878579	878637	878694	878752
757	879096	879153	879211	879268	879325
758	879665	879726	879784	879841	879898
755	880242	880299	880356	880413	880471

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5	6	7	8	9	D
863624	863679	863739	863799	863858	59
864218	864274	864333	864392	864452	59
864800	864867	864926	864985	865045	59
865400	865459	865519	865578	865637	59
865992	866051	866110	866169	866228	59
866583	866642	866701	866759	866819	59
866173	867332	867291	867349	867409	59
867763	867822	867879	867939	867998	59
868355	868409	868468	868527	868586	59
868938	868997	869056	869114	869173	59
869525	869584	869642	869701	869759	59
870111	870169	870228	870287	870345	59
870696	870755	870813	870872	870930	58
871281	871339	871398	871456	871515	58
871865	871923	871981	872039	872098	58
872448	872506	872564	872622	872681	58
873029	873088	873146	873204	873262	58
873611	873669	873727	873785	873844	58
874192	874249	874308	874366	874424	58
874772	874829	874888	874945	875003	58
875351	875409	875466	875524	875582	58
875929	875987	876045	876102	876160	58
876507	876564	876622	876679	876737	58
877083	877141	877199	877256	877314	58
877659	877717	877774	877832	877889	58
878234	878292	878349	878407	878464	57
878808	878866	878924	878981	879039	57
879382	879456	879497	879555	879612	57
879955	880013	880070	880127	880185	57
880527	880585	880642	880699	880756	57

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N	0	1	2	3	4
760	880814	880871	880928	880985	881042
761	881385	881442	881499	881556	881613
562	881955	882012	882069	882126	882183
753	882525	882581	882638	882695	882752
764	883093	883050	883207	883264	883321
765	883661	883718	883775	883832	883888
766	884229	884285	884342	884399	884455
767	884795	884852	884909	884965	885022
768	885361	885418	885474	885531	885587
769	885926	885983	886039	886096	886152
770	886491	886547	886604	886659	886719
771	887054	887111	887167	887223	887279
772	887617	887574	887720	887786	887842
773	888179	888236	888292	888348	888404
774	888741	888797	888853	888909	888965
775	889302	889358	889414	889469	889526
776	889862	889918	889974	890029	890086
777	890421	890477	890533	890589	890645
778	890979	891035	891091	891147	891203
779	891537	891593	891649	891705	891760
780	892095	892150	892206	892262	892317
781	892651	892707	892762	892818	892873
782	893207	893262	893318	893373	893429
783	893752	893817	893873	893928	893984
784	894316	894371	894427	894482	894538
785	894869	894925	894980	895036	895091
786	895423	895478	895533	895588	895644
787	895975	896029	896085	896140	896195
788	896526	896581	896636	896692	896747
789	897077	897132	897187	897242	897297

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0	6	7	8	9	D
881099	881156	881213	881271	881328	57
881669	881727	881784	881841	881898	57
882239	882297	882354	882411	882468	57
882809	882866	882923	882979	883037	57
883377	883434	883491	883548	883605	57
883945	884002	884059	884115	884172	57
884512	884569	884625	884682	884739	57
885078	885135	885192	885248	885305	57
885644	885700	885757	885813	885869	57
886209	886265	886321	886378	886434	56
886773	886829	886885	886941	886998	56
887336	887392	887449	887505	887561	56
887899	887955	888011	888067	888123	56
888460	888516	888573	888629	888685	56
889021	889077	889134	889189	889245	56
889582	889638	889694	889749	889806	56
890141	890197	890253	890309	890365	56
890700	890756	890812	890868	890924	56
891259	891314	891370	891426	891482	56
891816	891872	891928	891983	892039	56
892373	892429	892484	892539	892595	56
892929	892985	893040	893096	893151	56
893484	893539	893595	893651	893706	56
894039	894094	894149	894205	894261	55
894593	894648	894704	894759	894814	55
895146	895201	895257	895312	895367	55
895699	895754	895809	895864	895919	55
896251	896306	896361	896416	896471	55
896802	896857	896912	896967	897022	55
897352	897407	897462	897517	897572	55

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N	0	1	2	3	4
790	897627	897682	897737	897792	897847
791	898176	898231	898285	898341	898396
792	898725	898780	898835	898889	898944
793	899273	899328	899383	899437	899492
794	899821	899875	899925	899985	900039
795	900397	900442	900476	900531	900586
799	900913	900968	901022	901077	901131
797	901458	901513	901567	901622	901676
798	902003	902057	902112	902166	902221
799	902547	902601	902655	902709	902764
800	903089	903144	903194	903253	903307
801	903633	903687	903741	903795	903849
802	904174	904229	904283	904337	904391
803	904718	904767	904824	904878	904932
804	905256	905318	905364	905418	905472
805	905796	905845	905904	905958	906012
806	906335	906389	906443	906497	906551
807	906874	906927	907081	907035	907089
808	907411	907465	907519	907573	907626
809	907949	908002	908045	908109	908163
810	908485	908539	908592	908646	908699
811	909021	909074	909128	909181	909235
812	909555	909609	909663	909716	909769
813	910091	910144	910197	910251	910304
814	910624	910678	910731	910784	910838
815	911158	911211	911263	911317	911371
816	911692	911743	911797	911846	911903
817	912222	912275	912323	912381	912435
818	912763	912805	912859	912913	912966
819	913284	913327	913389	913443	913496

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5	6	7	8	9	D
897902	897957	898012	898067	898122	55
898451	898506	898561	898615	898670	55
898999	899054	899109	899164	899218	55
899547	899602	899656	899711	899766	55
999094	999149	999203	999258	999312	55
90064	900695	900749	900804	900859	55
901186	901240	901290	901349	901404	55
901731	901785	901839	901894	901948	54
902275	902329	902384	902438	902492	54
902818	902873	902927	902981	903036	54
903361	903416	903469	903524	903578	54
903904	903956	904012	904066	904120	54
904445	904499	904553	904607	904661	54
904986	905039	905094	905148	905202	54
905526	905580	905634	905688	905742	54
906066	906119	906173	906227	906281	54
906664	906718	906772	906826	906880	54
907143	907196	907250	907304	907358	54
907680	907734	907787	907841	907895	54
908217	908270	908324	908378	908431	54
908763	908817	908870	908924	908977	54
909289	909342	909396	909449	909503	54
909823	909877	909930	909984	910037	53
910358	910411	910464	910518	910571	53
910919	910972	911025	911078	911131	53
911424	911477	911530	911584	911637	53
911956	912009	912063	912116	912169	53
912488	912541	912594	912647	912700	53
913019	913072	913125	913178	913231	53
913549	913602	913655	913708	913761	53

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N	0	1	2	3	4
820	913814	913867	913919	913973	914026
821	914343	914396	914449	914502	914555
822	914872	914925	914977	915030	915083
823	915399	915453	915505	915558	915611
824	915927	915979	915033	916045	916138
825	916454	916507	916559	916612	916664
826	916980	917033	917085	917138	917190
827	917506	917558	917611	917663	917716
828	918030	918083	918155	918188	918240
829	918555	918607	918659	918712	918764
730	919078	919130	919183	919235	929287
831	919601	919653	919706	919758	919810
832	920123	920176	920228	928279	920332
833	920645	920697	920749	920801	920853
834	921166	921218	921270	921322	921374
835	921686	921738	921790	921842	921894
836	922206	922258	922310	922362	922414
837	922725	922777	922829	922881	922933
838	923244	923296	923348	923359	923451
839	923762	923814	923865	923917	923969
840	924279	924331	924383	924434	924486
841	924796	924848	924899	924951	925003
842	925312	925364	925415	925467	925518
843	925828	925879	925931	925982	926034
844	926342	926394	926445	926497	926548
845	926857	926908	926959	927011	927062
846	927370	927422	927473	927524	927576
847	927883	927935	927986	928037	928088
848	928396	928447	928498	928549	928601
849	928908	928959	929009	929061	929112

The Table of Logarithmes.

5	6	7	8	9	10
914079	914132	914184	914237	914290	53
914608	914660	914713	914766	914819	53
915138	915189	915241	915294	915347	52
915614	915617	915716	915812	915875	23
916191	916242	916296	916349	916401	53
916717	916759	916822	916875	916927	53
917243	917295	917348	917400	917453	53
917768	917820	917873	917925	917978	52
918293	918345	918397	918449	918502	52
918816	918869	918921	918973	919026	52
919339	919392	919444	919496	919549	52
919862	919914	919967	920019	920071	52
920384	920436	920489	920541	920593	52
920906	920918	921009	921062	921114	52
921426	921578	921530	921582	921634	51
921946	921998	922050	922102	922154	52
922466	922518	922569	922622	922674	52
922985	923037	923089	923140	923192	52
923503	923555	923607	923658	923710	52
924021	924072	924124	924175	924228	52
924538	924589	924641	924693	924744	52
925054	925106	925157	925209	925261	52
925569	925621	925673	925725	925776	52
926085	926137	926188	926239	926291	51
926599	926651	926702	926754	926805	51
927114	927165	927216	927268	927319	51
927627	927678	927729	927781	927832	51
928139	928191	928242	928293	928345	51
928652	928703	928754	928805	928857	51
929163	929215	929266	929317	929368	1

The Table of Logarithmes.

N	0	1	2	3	4
850	929419	929470	929521	929572	929623
851	929929	929981	930032	930083	930134
852	930439	930491	930542	930592	930643
853	932949	930999	931051	931102	931153
854	931458	931509	931559	931610	931661
855	931966	932017	932068	932118	932169
856	932474	932524	932575	932626	932677
859	932981	933031	933082	933133	933183
858	933487	933538	933589	933639	933689
852	933993	934044	934094	934145	934195
860	934468	934549	934599	934649	934700
861	935003	935096	935104	935154	935205
892	935507	935558	935608	935659	935709
863	936011	936061	936111	936162	936212
864	936514	936564	936614	936665	936715
865	937016	937066	937117	937167	937217
866	937518	937568	937618	937668	937728
867	938019	938069	938119	938169	938219
858	938519	938569	938619	938669	938719
869	939019	939069	939119	939169	939219
870	939519	939569	939619	939669	939719
871	940018	940068	940118	940168	940218
872	940516	940566	940617	940666	940716
873	941014	941064	941114	941163	941213
874	941511	941561	941611	941660	941710
875	942008	942058	942107	942157	942207
876	942504	942554	942603	942653	942702
877	942999	943049	943099	943148	943198
878	943495	943544	943594	943643	943692
879	943989	944038	944088	944137	944186

The Table of Logarithmes.

5	6	7	8	9	D
929674	929725	939776	929827	929879	58
930185	930236	930287	930338	930389	58
930694	930745	930796	930847	930898	58
931204	931254	931305	931356	931407	58
931712	931763	931814	931865	931915	58
932220	932271	932322	932372	932423	58
932727	932778	932829	932879	932930	58
933234	933285	933335	933386	933437	58
933740	933791	933841	933892	933943	58
934246	934296	934347	934397	934448	58
934751	934801	934852	934902	934953	58
935255	935306	935356	935406	935457	58
935759	935809	935859	935910	935960	58
936262	936313	936363	936413	936463	58
936765	936815	936865	936915	936966	58
937267	937317	937366	937416	937468	58
937769	937819	937869	937919	937969	58
938269	938319	938369	938419	938469	58
938769	938819	938869	938919	938969	58
939269	939319	939369	939419	939469	58
939799	939819	939869	939918	939968	58
940267	940317	940367	940417	940467	58
940765	940815	940865	940915	940964	58
941263	941313	941362	941412	941462	58
941759	941809	941859	941909	941958	58
942256	942306	942355	942405	942455	58
942752	942801	942851	942901	942950	58
943247	943297	943346	943396	943445	49
943742	943791	943841	943890	943939	49
944236	944285	944335	944384	944433	49

The Table of Logarithmes.

N	0	1	2	3	4
880	944483	944532	944581	944631	944680
881	944976	945025	945074	945124	945173
882	945468	945518	945567	945616	945665
883	945951	946000	946050	946100	946150
884	946452	946501	946551	946600	946649
885	946943	946992	947041	947091	947139
886	947434	947483	947532	947581	947629
887	947924	947973	948022	948071	948119
888	948413	948462	948511	948560	948609
889	948902	948951	948999	949048	949097
890	949390	949439	949488	949536	949585
891	949878	949927	950075	950124	950173
892	950355	950404	950452	950501	950550
893	950851	950900	950948	950997	951046
894	951338	951386	951435	951483	951532
895	951823	951872	951920	951969	952017
896	952308	952356	952405	952453	952502
897	952792	952841	952889	952938	952986
898	953276	953325	953373	953421	953469
899	953759	953808	953856	953905	953953
900	954243	954291	954339	954387	954435
901	954725	954773	954821	954869	954918
902	955207	955255	955303	955351	955399
903	955688	955736	955784	955832	955880
904	956168	956216	956265	956313	956361
905	956649	956697	956745	956793	956840
906	957128	957176	957224	957272	957320
907	957607	957655	957703	957751	957799
908	958086	958134	958181	958229	958277
909	958564	958612	958659	958707	958755

Abbr. Table of Logarithmes.

5	6	7	8	9	D
944729	944779	944828	944877	944926	49
945222	945272	945321	945370	945419	49
945715	945764	945813	945862	945912	49
946207	946276	946305	946354	946403	39
946698	946647	946796	946845	946894	49
947189	947238	947287	947336	947385	49
947679	947728	947677	947825	947875	49
948168	948217	948266	948316	948364	49
948657	948706	948755	948804	948853	49
949146	949195	949244	949292	949341	49
949633	949683	949731	949780	949826	49
950121	950170	950219	950267	950316	49
950608	950657	950706	950754	950803	49
951091	951143	951192	951240	951289	49
951582	951629	951677	951729	951775	49
952066	952114	952163	952211	952299	49
952550	952599	952647	952696	952744	48
953034	953083	953131	953179	953228	48
953518	953566	953615	953663	953711	48
954001	954049	954099	954146	954194	48
954484	954532	954580	954628	954677	48
954966	955014	955062	955110	955158	48
955447	955495	955543	955592	955639	48
955928	955976	956024	956072	956120	48
956409	956457	956505	956553	956601	48
956888	956936	956984	957032	957080	78
957368	957416	957464	957512	957559	48
957847	957894	957942	957990	958038	48
958325	958373	958421	958468	958516	48
958803	958850	958898	958946	958994	48

The Table of Logarithmes.

N	0	1	2	3	4
910	959041	959089	959127	959185	959232
911	959518	959566	959614	959661	959709
912	959995	959042	950090	960138	960185
913	960471	960518	960590	960613	960651
914	960946	960994	961041	961089	961136
915	961421	961469	961516	961563	961611
916	961895	961943	961990	962038	962085
917	962369	962417	962464	962511	962559
918	962842	962889	962927	962985	963032
919	963315	963363	963410	963457	963504
920	963788	963885	963882	963999	963977
921	964259	964377	964354	964401	964448
922	964731	964770	964825	964872	964919
923	965202	965249	965296	965343	965389
924	965672	965719	965766	965813	965859
925	966142	966189	966239	966283	966329
926	966611	966658	966705	966752	966799
927	967079	967215	967173	967220	967267
928	967548	967795	967642	967688	967735
929	968016	968062	968109	968156	968202
930	968483	968529	968576	968623	968669
931	968949	968996	969043	969089	969136
932	969416	969463	969559	969556	969602
933	969882	969928	969975	970021	960068
934	970347	970393	970439	970486	960533
935	970812	970858	970904	970951	970997
936	971276	971322	971259	971415	971461
937	971739	971786	971832	971879	971925
938	972203	972249	972295	972342	972388
939	972666	972712	972758	972804	972851

The Table of Logarithmes

5	6	7	8	9	D
959279	959328	959375	959423	959471	48
959757	959804	959852	959899	959947	48
960233	960280	960328	960376	960423	48
960709	960756	960804	960851	960899	48
961184	961231	961279	961326	961374	47
961658	961706	961753	961801	961848	47
962132	962179	962227	962275	962322	47
962606	962653	962701	962748	962795	47
963079	963126	963174	963221	963268	47
963552	963599	963646	963693	963741	47
964024	964071	964118	964168	964212	47
964495	964542	964589	964637	964684	47
964966	965013	965061	965108	965145	47
965437	965484	965531	965578	965624	47
965906	965954	966001	966048	966095	47
966376	966423	966470	966517	966574	47
966845	966892	966939	966986	967033	47
967314	967361	967408	967454	967501	47
967782	967829	967875	967922	967969	47
968249	968296	968343	968389	968436	47
968716	968763	968809	968856	968902	47
969183	969229	969276	969323	969369	47
969648	969695	969741	969789	969835	47
970114	970161	970207	970254	970300	47
970579	970626	970672	970719	970765	46
971044	971090	971137	971183	971229	46
971508	971554	971601	971647	971693	46
971971	972018	972064	972110	972157	46
972434	972481	972527	972573	972619	46
972897	972943	972989	973035	973082	46

The Table of Logarithmes.

N	0	1	2	3	4
940	973120	973174	973220	973266	973313
941	973589	973636	973682	973728	973774
942	974050	974097	974143	974189	974235
943	974512	974558	974604	974649	974695
944	974975	975018	975064	975109	975159
945	975432	975478	975524	975569	975616
946	975891	975937	975983	976029	976075
947	976349	976395	976442	976488	976533
948	976808	976854	976899	976946	976992
949	977266	977312	977358	977403	977449
950	977724	977769	977815	977861	977906
951	978181	978226	978272	978317	978363
952	978637	978683	978728	978774	978819
953	979093	979138	979184	979229	979275
954	979548	979594	979639	979685	979730
955	980003	980049	980094	980139	980185
956	980458	980503	980549	980594	980639
957	980912	980957	981003	981048	981093
958	981366	981411	981456	981501	981547
959	981819	981864	981909	981954	981999
960	982271	982316	982362	982407	982452
961	982723	982769	982814	982859	982904
962	983175	983220	983265	983310	983356
963	983626	983671	983716	983762	983807
964	984077	984122	984167	984212	984257
965	984527	984572	984617	984662	984707
966	984977	985022	985067	985112	985157
967	985426	985471	985516	985561	985606
968	985875	985920	985965	986009	986055
969	986324	986369	986413	986458	986504

The Table of Logarithms.

5	6	7	8	9	D
973359	97340	973451	973497	973543	46
973820	973866	973913	973959	974005	46
974281	974327	974374	974419	974466	46
974742	974788	974834	974819	974926	46
975202	975248	975294	975339	975386	46
975662	975707	975753	975799	975845	46
976121	976167	976212	976258	976304	46
976579	976625	976671	976717	976763	46
977037	977083	977129	977175	977220	46
977495	977541	977586	977632	977678	46
977952	977998	978042	978089	978135	46
978409	978454	978500	978546	978591	46
978865	978911	978956	979002	979047	46
979321	979366	979412	979457	979503	46
979776	979821	979867	979912	979958	46
980231	980276	980322	980367	980412	45
980685	980730	980776	980821	980867	45
981139	981184	981229	981275	981320	45
981592	981637	981683	981728	981773	45
982045	982090	982135	982181	982226	45
982497	982543	982588	982633	982678	45
982949	982994	983039	983085	983129	45
983401	983446	983490	983536	983581	45
983852	983897	983942	983987	984032	45
984302	984347	984392	984437	984482	45
984752	984797	984842	984887	984933	45
985202	985247	985292	985337	985382	45
985651	985696	985741	985786	985830	45
986099	986144	986189	986234	986279	45
986548	986593	986637	986682	986727	45

The Table of Logarithmes.

N	0	1	2	3	
970	986772	986817	986861	986905	986951
971	987219	987264	987309	987353	987398
972	987666	987711	987756	987800	987845
973	988113	988157	988202	988243	988291
974	988559	988604	988748	988697	988737
975	989005	989044	989094	989138	989183
976	989449	989494	989539	989584	989628
975	989895	989939	989983	990028	990072
978	990339	990383	990418	990472	990516
979	990783	990827	990871	990916	990960
980	991226	991270	991315	991359	991403
981	991669	991713	991758	991802	991846
982	992111	992156	992199	992244	992288
983	992554	992598	992642	992686	992730
984	992995	993039	993083	993127	993172
985	993436	993480	993524	993568	993613
986	993877	993921	993965	994009	994053
987	994317	994361	994405	994449	994493
988	994756	994801	994845	994889	994933
989	995196	995240	995284	995328	995372
990	995635	995679	995723	995764	995811
991	996074	996117	996161	996205	996249
992	996512	996555	996599	996643	996687
993	996949	996993	997037	997080	997124
994	997386	997430	997474	997517	997561
995	997823	997867	997910	997954	997998
996	998259	998303	998347	998390	998434
997	998695	998739	998783	998826	998869
998	999133	999174	999218	999261	999305
999	999565	999609	999652	999696	999739

The Table of Logarithmes.

5	6	7	8	9	D
986699	977040	987085	987126	987175	45
987443	987488	987532	987577	987622	45
987889	987934	987979	988024	988068	45
988336	988381	988425	988469	988514	45
988782	988826	988871	988916	988960	45
989227	989272	989316	989361	989405	45
989672	989717	989751	989806	989850	44
990117	990161	990206	990250	990294	44
990561	990605	990649	990694	990738	44
991004	991049	991093	991137	991182	44
991448	991492	991536	991580	991625	44
991890	991935	991979	992023	992067	44
992333	992377	992421	992465	992509	44
992774	992819	992863	992907	992951	44
993216	993259	993304	993348	993392	44
993657	993701	993745	993789	993833	44
994097	994141	994185	994229	994273	44
994537	994581	994625	994669	994713	44
994977	995021	995065	995108	995152	44
995416	995459	995504	995547	995591	44
995854	995898	995942	995985	996029	44
996293	996337	996380	996424	996468	44
996731	996774	996818	996862	996909	44
997168	997212	997255	997299	997343	44
997905	997948	997992	998036	998079	44
998041	998085	998129	998172	998216	44
998477	998521	998564	998608	998652	44
998913	998956	998999	999043	999087	44
999348	999392	999435	999479	999522	44
999783	999826	999869	999913	999957	43

The 7th of February

[illegible]

A N
APPENDIX

TO THE

Guide for the Practical Gauger

Wherein is briefly yet plainly shewed the

MENSURATION

Of Superficies and Solids, as

Board,
Glass,
Pavement,
Plaistering,
Painting,
Wainscot,
Hangings,

Tiling,
Slating,
Flooring,
Partition,
Roofs,
Brick-work,
Timber, and
Stone.

Both Arithmetically, and by Decimal Tables:

AS ALSO,

A Table of LOGARITHMS,

Of excellent Use for all those that delight in
the Practical part of **GEOMETRY,**

By William Hunt Student in the Mathematicks,

London, Printed for Nathaniel Ponder, Anno Dom, 1673.

APPENDIX

Quills for the Pen and Gage

И О П Т А Н И З М

or Philadelphia

TABLE 1. Continued

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1. The first part of the document is a list of names and titles, including "The Hon. Mr. Justice" and "The Hon. Mr. Justice".

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APPENDIX

TO THE

Guide to the Practical Gauger,

Containing various Precepts for the Measurement of Planes and Solids.

I. How to Measure Superficies.

ALL manner of Superficies are measured after one and the same manner, only with this Distinction, each Foot hath 144 Square Inches.

1. *Board and Glass are measured by the Foot Square.*

2. *Paving, Plaistering, Painting, Wainscot, Hangings, &c. by the Yard Square (each Yard hath 9 Square Feet.)*

3. *Tiling, Slating, Flooring, Partitions, Roofs, &c. by the Square, (which is 10 Foot every way, in all 100 Foot.)*

Now the ordinary Rulers for measuring these Planes, are of Feet, and Inches, each Foot divided into 12 Inches, and every of those Inches Sub-divided into Halfs, Quarters,

A

and

and half Quarters, which causeth much trouble in the work by reason of the Fractions.—

Therefore I judge it better to have the Ruler divided Decimally, (*i.e.*) the Inch divided into 10 parts instead of halves, quarters, and half quarters, and then the work will be more easie, as may appear by the following examples.

Prop. I. For Board, Glass,

The usual way to Measure these is thus,—
To Multiply the Inches of the Breadth by the Inches of the Length, and to divide the Product by 144 (*the Square Inches in a Foot*) the Quotient is the Content in Feet, &c.

Example.

Let a Board be $\left\{ \begin{array}{l} \text{Long, } 213.5 \\ \text{Broad, } 27.5 \end{array} \right\}$ Inches,

$$144) 5871.25 (40.77$$

Responj. The Content $40. \frac{3}{4}$ Feet +

Note.

If they are Broader at one end than at the other, adde both ends together, and take half for a Mean-breadth, which is near enough in Superficies, though not in Solids.

But the best way to Measure these Planes, is, to let your Ruler be divided into Feet, and 100 parts of a Foot, instead of Feet and Inches; And then if you Multiply the Length by the Breadth, the Product is the Content in Feet, &c. without any more trouble, separating

as

[3]

as many Figures from the Quotient by a Point . or Comma , as are required by the Doctrine of Decimals.

Example I.

A Board or Plank 2.25 Foot Broad, and 17.75 Foot long : How many Square Feet doth it Contain?

A Plank is $\left\{ \begin{array}{l} \text{Long, } 17.75 \\ \text{Broad, } 2.25 \end{array} \right\}$ Feet, &c.

Respons. The Content 39.9375 Feet, &c.

Example II.

A Pane of Glass is 1.75 Foot Broad, and 3.5 Foot high, and of these in one Window there is 20 : How many Foot is contained therein?

A Pane $\left\{ \begin{array}{l} \text{Br. } 1.75 \\ \text{Hi. } 3.5 \end{array} \right\}$ F.

The Prod. - 6.125

Numb. of Pan. - 20

Respons. - 122.500

(i. e.) 122. $\frac{1}{2}$ Foot for the Content of the whole Window

A Table of Reduction of Inches, &c. to Decimals, the Integer being a Foot.

Inch	Decimals of a Foot.	Inch.	Quar.	Half	Decimals of a Foot
1	.0833-	3			.0625
2	.1667+	2			.0417+
3	.25	1			.0208-
4	.3333-				
5	.4167+				
6	.5				
7	.5833-				
8	.6667+				
9	.75				
10	.8333-				
11	.9167+				

Prop. II. For Paving, Plaistering, Painting, Wainscot, Hangings.

A 3

Example,

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Example I.

There is a Yard paved whose Length is 31.5 Foot, and Breadth 13.5 Foot : How many Square Yards are there contained therein?

The $\left\{ \begin{array}{l} \text{Length, } 31.5 \\ \text{Breadth, } 13.5 \end{array} \right\}$ Foot, &c.

9)425.25(47.25

Respons: The Content in Yards $47\frac{1}{4}$.

But the best way also to Measure by the Yard, is to have a Ruler of a Yard long divided into 100 parts, instead of Feet and Inches, and then if you Multiply the Length by the Breadth, the Product is the Content in Yards *prope verum*.

Example II.

If a Room be 10.5 Yards about, and 4.5 High : How many Yards of Wainscoting is there in the Room?

The $\left\{ \begin{array}{l} \text{Girt about } 10.5 \\ \text{Height} \text{ --- } 4.5 \end{array} \right\}$ Yards, &c.

Respons. The Content 47.25.

(i. e.) $47\frac{1}{4}$ Yards.

Example III.

A Cieling is 16.75 Yards long, and 9.5 Yards broad : How many Yards are contained therein?

Cieling $\left\{ \begin{array}{l} \text{Long-- } 16.75 \\ \text{Broad-- } 9.5 \end{array} \right\}$ Yards, &c.

Respons. The Content 159.125

(i. e.) $159\frac{1}{8}$ Yards,

Prop. III. For Tiling, Slating, Flooring, Partitions, Roofs, &c.

Example,

Example,

There is a Roof, whose length with the large Courses, is 46.25 Feet, and length of the Rafter with the Turnings and Eves-board 20 Foot (*which must be doubled to take in both sides*) How many Square of Tiling will cover the Roof?

Length — 46.25 Foot, &c.

Rafters length — 40.00 doubled,

Product — 1850.00 is the Square Feet

100)1850(18.50

Respons: The Content is 18.½ Square just,

Having the Breadth, to find how much in Length, will make a Square or a Yard,

Rule,

Divide 100 or 9, (*according to the tenor of the Question,*) by the Breadth, the Quotient is the length of a Square, or Yard,

Examples,

Bredth 16.25)100.0000(6.15 leng: of a Square

Bredth 17.33) 9. 0000 (.05 length of a Yard,

A Rule to make a Table for Board-measure, which may shew the length of a Foot from 1 Inch, to what number of Inches you please,

Divide 144 (*the Inches in a Foot Square*) by the Inches of the Breadth, the Quotient is the length required,

Examples,

Breadth, 8)144(18, Length, 18)144(8 length,

So that opening the Compasses to any distance given, and turning them to the end of the Board, you may find how many Feet it is in length.

A Table of Superficial Measure,

Inch.	0		$\frac{1}{4}$		$\frac{1}{2}$		$\frac{3}{4}$	
	Feet.	Parts	Feet.	Parts	Feet.	Parts	Feet.	Parts
1	0	083	0	104	0	125	0	146
2	0	167	0	187	0	208	0	229
3	0	250	0	270	0	291	0	312
4	0	333	0	354	0	375	0	396
5	0	417	0	437	0	458	0	479
6	0	500	0	521	0	542	0	562
7	0	583	0	604	0	625	0	646
8	0	667	0	687	0	708	0	729
9	0	750	0	770	0	791	0	812
10	0	833	0	854	0	875	0	896
11	0	917	0	937	0	958	0	979
12	1	000	1	021	1	042	1	062
13	1	083	1	104	1	125	1	146
14	1	167	1	187	1	208	1	229
15	1	250	1	270	1	291	1	312
16	1	333	1	354	1	375	1	396
17	1	417	1	437	1	458	1	479
18	1	500	1	521	1	542	1	562
19	1	583	1	604	1	625	1	646
20	1	667	1	687	1	708	1	729
21	1	750	1	770	1	791	1	812
22	1	833	1	854	1	875	1	896
23	1	917	1	937	1	958	1	979
24	2	000	2	021	2	042	2	062
25	2	083	2	104	2	125	2	146
26	2	167	2	187	2	208	2	229
27	2	250	2	270	2	291	2	312
28	2	333	2	354	2	375	2	396
29	2	417	2	437	2	458	2	479
30	2	500	2	521	2	542	2	562
31	2	583	2	604	2	625	2	646
32	2	667	2	687	2	708	2	729
33	2	750	2	770	2	791	2	812
34	2	833	2	854	2	875	2	896
35	2	917	2	937	2	958	2	979
36	3	000	3	021	3	042	3	062

The Construction of the preceding Table,

Divide a Unit, or 1 with Cyphers annexed by 12, the Quotient is the Tabular Number, and so on for 4 or 5 more, and then by taking their Differences, the Table is made by interpolation.

Example,

$$12)1.000(0.083 \quad 12)1.250(0.104.$$

$$12)1.500(0.125 \quad 12)1.750(0.146.$$

The Use of the Table,

Enter the Table with the Breadth in Inches in the first Column, and directly against it in the Common Angle, is the Content of 1 Foot length thereof, which Multiplied by the length in Feet, &c. produce the whole content in Feet, &c.

Example I.

Suppose a stock of Boards is sawn off 18 Boards, each 9 Inches Broad, and 20.5 Foot long : what is the Content ?

Length of the Boards 20.5 Foot, &c.

Number of Boards — 18

Product — 369.0

Bredth 9 Inch. per Table — .750

Respons: The Content — 276.7500

Example,

Example II.

Let a Pane of Glafs be long or high 17.5 Foot,
&c. and broad 13.5 Inches: what is the Content?

$$\begin{array}{r}
 \text{Length } 17.5 \text{ Feet, \&c.} \\
 13.5 \text{ Inches per Table} = 1.125 \\
 \hline
 \text{Resp: } 19\frac{1}{2} \text{ Feet the Content } 19.6875
 \end{array}$$

Prop: IV. *How to Measure Brick-work,*

Brick-work is generally Measured by the Pole,
or Rod, which is $16\frac{1}{2}$ Foot Square, (*i. e.*)
272.25 Inches, which way, though it may serve
in long Gardens, or Park-walls, yet for Houses
the best way (*I suppose*) is to Measure them by
the Foot, every Story by its self, according to
the different thickness, reducing it all into half
Bricks, and Dividing the Sum of the Product by
816.75 (*triple the Square Inches in a Rod,*)
though it is common among Measurers to Di-
vide by 816, the Quotient is the Content in
Rods, and one Brick and a half thick,

Or dividing the Sum of the Products by 3,
the Quotient is the Content in Feet, &c.

Example,

There are two Side-walls in a Cellar, each
29 Foot long, 7 Foot high, and 2 Bricks thick;

The Front-wall and Back-wall are each 15
Foot long, 7 Foot High, and $2\frac{1}{2}$ Bricks thick,

There

There is also a Partition-wall therein 15 Foot long, 7 Foot High, and $1\frac{1}{2}$ Brick thick: How many Feet is contain'd in this Brick-work? And also how many Square Rods?

Walls length 29 Foot, 15 F. front, 15 F. Part:

29	15	7
Sum 58	30	105
Hight 7	7	$3\frac{1}{2}$ Brick
Product 406	210	
$\frac{2}{3}$ Bricks is 4	5 $2\frac{1}{3}$ Br:	315
		1050
1624	1050	1624

The Sum of the Products — 2989

3) 2989.00 (996.33
 Respons: 996. $\frac{1}{3}$ Content in Feet, &c.

816.75) 2989.00000 (3.659
 Respons: The Content $3\frac{1}{2}$ Rods +

Or instead of Dividing by 816.75, you may Multiply the Sum of the Products by this Decimal Fraction. 0012243 separating from the Product 7 Figures towards your right hand by a Point. or Comma, and you have the Content in Rods, &c. as before.

Now this Multiplier is found by dividing a Unit, or 1 with Cyphers by the Divisor above said, viz. 816.75.

Example,

Example,

The } Proper Multiplier is .0012243
 Sum before found is 2989

Respons: The Cont. $3\frac{1}{2}$ as above 36594327

II. How to Measure Solids,

In Measuring Board, Glass, or any other Superficies, respect is to be had only to the Length and Breadth; but here you must observe length, Breadth, and Depth, or Thickness.

Note that 1728 $\left\{ \begin{array}{l} 12 \text{ Inches in a Foot,} \\ 12 \\ \hline 144 \text{ Square Inches in a Foot} \\ 12 \\ \hline 1728 \text{ Cube Inches in a Foot} \end{array} \right.$
 Cube Inches make
 a Foot, as in the
 Margent, and 40
 Foot make a Tun.

Timber is generally cut out into long Square pieces, or supposed to be so. — And the Rule commonly used is this. — To multiply the Inches of the Breadth by the Inches of the Depth or Thickness, and the Product by the Inches of the length, the last Product Divided by 1728 (*the Cube Inches in a Foot,*) the Quotient is the Content in Feet, &c. Example I.

If a piece of Timber be 15 Inches Square, and 33 Foot long: How many Feet of Timber is contained therein?

15 Inches Square	33 Foot
<u>15</u>	<u>12</u>
225 1 Product	396 2 Product.
<u> </u>	<u>225 1 Product.</u>

1728)89100.000(51.563

Respons: The Content $51\frac{1}{2}$ Foot and better.

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Example II.

There is a Piece of Stone 30 Inches Broad, 21 Inches Deep, and 15.5 Foot long: How many Square Foot of Stone is there contained therein?

Broad 30	}	Inches,	15.5 Foot
Deep 21			12
<hr style="width: 100px; margin-left: 0;"/>			<hr style="width: 100px; margin-left: 0;"/>
630		1 Product	186 2 Product,
			<hr style="width: 100px; margin-left: 0;"/>
			630 1 Product,

1728) 117180.00 (67.81

Respons: The Content 67.³/₄†

But the best way is to Measure it by a Foot divided into 100 parts instead of Feet and Inches as directed in *Superficial Measure*, and then the work is performed by Multiplication only, distinguishing so many Figures from the Product towards the right hand by a Point, or Comma, as are required by the Doctrine of Decimals.

Example,

There is a piece of Timber, or Stone 2.5 Foot broad, 1.75 Foot deep, and 15.5 Foot long: What is the Content?

Timber	}	Broad 2.5	}	Feet, &c.
		Deep 1.75		

Product — 4.375
Multipl. by the length 15.5
<hr style="width: 100px; margin-left: 0;"/>

Resp: The Content as above 67.8125

*A Table shewing the true Quantity of one Foot length of
any true Squared piece of Timber.*

Inch.	0	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
	Feet. Parts	Feet. Parts	Feet. Parts	Feet. Parts
2	0 . 082	0 . 035	0 . 043	0 . 019
3	0 . 163	0 . 074	0 . 085	0 . 097
4	0 . 111	0 . 125	0 . 140	0 . 156
5	0 . 174	0 . 192	0 . 210	0 . 229
6	0 . 250	0 . 271	0 . 293	0 . 316
7	0 . 340	0 . 365	0 . 390	0 . 417
8	0 . 444	0 . 472	0 . 502	0 . 532
9	0 . 562	0 . 594	0 . 627	0 . 660
10	0 . 694	0 . 729	0 . 765	0 . 802
11	0 . 840	0 . 879	0 . 919	0 . 959
12	1 . 020	1 . 042	1 . 085	0 . 128
13	1 . 174	1 . 219	1 . 265	1 . 313
14	1 . 361	1 . 411	1 . 460	1 . 511
15	1 . 562	1 . 615	1 . 669	1 . 723
16	1 . 778	1 . 834	1 . 891	1 . 947
17	2 . 017	2 . 066	2 . 126	2 . 187
18	2 . 280	2 . 313	2 . 377	2 . 421
19	2 . 507	2 . 573	2 . 641	2 . 709
20	2 . 778	2 . 848	2 . 918	2 . 990
21	3 . 062	3 . 136	3 . 210	3 . 285
22	3 . 361	3 . 438	3 . 516	3 . 594
23	3 . 673	3 . 754	3 . 835	3 . 917
24	4 . 000	4 . 081	4 . 168	4 . 254
25	4 . 340	4 . 427	4 . 511	4 . 604
26	4 . 691	4 . 782	4 . 877	4 . 969
27	5 . 062	5 . 156	5 . 255	5 . 347
28	5 . 444	5 . 542	5 . 641	5 . 740
29	5 . 840	5 . 941	6 . 043	6 . 146
30	6 . 250	6 . 354	6 . 460	6 . 566
31	6 . 674	6 . 782	6 . 891	7 . 001
32	7 . 111	7 . 220	7 . 335	7 . 448
33	7 . 562	7 . 677	7 . 793	7 . 910
34	8 . 027	8 . 846	8 . 265	8 . 286
35	8 . 507	8 . 628	8 . 750	8 . 875
36	9 . 020	9 . 416	9 . 252	9 . 280

The Construction of the preceding Table,
 Square the several Inches and parts, then add
 Cyphers to the several Products, as many as is
 convenient, and Divide them by 144 *the Square*
Inches in a Foot] the Quotients are the Tabular
 Numbers required.

Examples.

2. Inches	2.25 Inches
2	2.25
<hr/>	<hr/>
144)4.000(0.028	144)5.0625(0.035

The Use of the Table,

Enter with the Breadth in Inches in the first
 Column, and against it in the common Angle
 is the Content of one Foot length thereof,
 which Multiplied by the length in Feet, &c.
 produceth the whole Content in Feet, &c.

Example.

There is a piece of Timber 15 Inches Square,
 and 33 Foot long : How many Feet is contained
 therein ?

Feet, &c.
 15 Inches Square *per Table*, gives — 1.562
 Multiplied by the length in Feet, — 33

Respons. The Content 51. $\frac{1}{2}$ Feet + — 51.546

How to Measure Timber not exactly Square.

The common way is to add the broader and
 narrower sides together, and to take half for
 the true Square : But this is false, and the grea-
 ter the difference of the sides is, the greater is
 the error.

Example,

Examples.

The { Breadth } of a Piece { 14 } Inches,
 { Depth } of Timber { 10 }

The { Sum 24
 Half 12 }

Now 12 times 12 is 144 Inches for the Area,
 Whereas 10 times 14 is but 140, so that way
 you see makes it too much by 4 Inches,

But let the { Breadth be — 12 } Inches,
 { Depth — 6 }

The { The Sum 18
 Half is — 9 }

Now 9 times 9 produces 81 Inches for the Area,
 Whereas 6 times 12 is but 72. Here the Error
 is intolerable.

*How to find the true Square of any piece of Timber
 or Stone by the Table of Radix's pag.*

Enter the Table with the narrower side at
 Top in Inches, and with the broader in the
 side Column, and in the common Angle of
 meeting you have the just Square, with which
 enter the Table for Timber pag. 12, and work
 as before directed.

Example,

Example.

If a piece of Timber, or Stone, be 8 Inches Broad, 5 Inches deep, and 10 Feet long: How many Feet doth it contain?

True square 6 $\frac{1}{2}$ Inches per } o. 2 ro.

Table pag. 11 ----- Multiplied by the Length ----- 10

Respons: The Content 2. $\frac{1}{2}$ Feet serè ----- 2. 77 1

Now if your Timber be 3, 4, 5, 6, or more sides Square all along then ----- Measure all the squares, and add them together, and take the half for one Breadth,

Measure from the Center to the midst of the square side be tween the two Angles, and that is the other Breadth.

Enter the Table of Radix's with these sides, and in the common angle you have the true square, with which enter the Table of Timber measure pag. 11. and finish the worke as before. *Example.*

There is a piece of Timber in forme of a Pentagonal solid, whose sides both above and below are equal each 12 Inches and Length 20 Feet: How many Feet of Timber is contained therein?

each side 12 Inches

Number of sides ----- 5

product ----- 60

is the Broader side ----- 30

The perpendicular ----- 8

B

Enter

Enter the Table with these two Breadths
and in the common Angle you will find the
true Square 15. $\frac{1}{2}$ Inches. Feet &c

15. $\frac{1}{2}$ Inches per Table pag— 1. 669

Multiplied by the Length in Feet— 20

Reſponſ: The Content 23. $\frac{1}{2}$ Feet \times — 33. 380

How to Measure Round Timber.

The common way is to gird it round with
a string, and ſoe doubling to $\frac{1}{2}$ take the string
fourth part for the true square thus —

If the compaſſe be 48 Inches they take 12
Inches for the true square, But this is falſe
which I thus proove —

Suppoſe the Diameter of a Circle 14 In-
ches; the Circumference will be 44 Inches
(according to Archimedes proportion as 7 to 22)
and the content 154 Inches (found by multi-
plying half the compaſſe by half the Diameter)

Whereas if you had taken a quarter of the
circumference for the square, viz 11 which
multiplied into its ſelf would yeild but 121
Inches to little by 33 Inches; ſoe that about
a fifth part is loſt by this way of meaſuring.

And the reaſon of this cuſtome I ſuppoſe
may be this, notwithstanding moſt Trees grow
Round, yet they muſt be hewed ſquare, ſoe
this is an Indifferent allowance between bu-
yer, and ſeller; neither to the full extent
becauſe

because of the waſt, nor according to the exact ſquare because that which is cut off is good for ſomething though not ſo good as the other.

How to find the greateſt ſquare that any piece of Round Timber can be hewen to.

Rule

Multiply the Compaſſe by this Decimal fraction (225 the product diſtinguiſhing 3 figures towards the right hand by a point is the Inſcribed Square.

Example.

The {	Compaſſe given	44
	Multiplicator proper	225
	Inſcribed ſquare	9.900

Inches

The {	Area inſcribed ſquare	98.016
	Area of the circle found	154

The {	Summe is	252.
	Half thereof	126
	Area by taking $\frac{1}{2}$ of the Com	121

Nowith ſtanding (*I judge*) it requiſite that the Content of the Timber ſhould be exactly known, as for Waſt, that ought to be obſerved in the piece.

*The Construction of the Table for Round Tim. p. 16.**Rule*

Multiply the Square of the Circumference given by this Decimal fraction, 00055262 the product cutting off 5 figures is the Measure of one Foot Length thereof.

The Use of the Table.

Enter the Table with the Compass of the Timber in Inches and against it in the next column stands the true quantity of one foot Length thereof, which multiplied by the number of feet *&c.* in Length produces the Content thereof in Feet, *&c.*

Note

If your piece of Timber exceed the Compass of 130 Inches then take the half, and find the number in the Table which multiplied by 4 shewes how many Feet, *&c.* make the measure of one foot Length.

After the same manner you may continue the Table for square Timber pag. 11.

A Table

*A Table which by the Comp. of any Round Timber show
the true Meas. of one foot Length thereof.*

Co n	Feet p.	Diff.	Com	Feet P. Dif.	Com	Feet P. Diff.	Com	Feet P. D. ff.			
10	0.055	.12	41	0.929	.45	72	2.864	.81	101	5.637	.112
11	0.067	.13	42	0.974	.47	73	2.945	.81	102	5.749	.113
12	0.079	.14	43	1.021	.49	74	3.026	.82	103	5.862	.114
12	0.092	.15	44	1.070	.49	75	3.108	.82	104	5.976	.116
14	0.108	.16	45	1.119	.50		3.108		105	6.092	.117
15	0.124	.17	46	1.169	.51			.83			
16	0.141	.18	47	1.220	.53	76	3.191	.85	106	6.209	.118
17	0.159	.20	48	1.273	.54	77	3.276	.86	107	6.337	.119
18	0.179	.21	49	1.327	.55	78	3.362	.87	108	6.466	.120
19	0.200	.22	50	1.381	.56	79	3.449	.88	109	6.596	.121
20	0.221	.22	51	1.447	.57	80	3.537	.86	110	6.727	.122
21	0.243	.24	52	1.494	.58	81	3.625	.90	111	6.859	.123
22	0.267	.25	53	1.552	.60	82	3.715	.92	112	6.992	.124
23	0.292	.26	54	1.612	.60	83	3.807	.92	113	7.125	.125
24	0.318	.27	55	1.672	.61	84	3.899	.94	114	7.258	.127
25	0.345	.29	56	1.733	.62	85	3.993	.94	115	7.392	.129
26	0.374	.29	57	1.795	.64	86	4.087	.96	116	7.527	.130
27	0.403	.30	58	1.859	.64	87	4.183	.96	117	7.662	.131
28	0.433	.32	59	1.923	.66	88	4.279	.98	118	7.798	.132
29	0.463	.32	60	1.989	.67	88	4.377	.98	119	7.935	.133
30	0.497	.34	61	2.056	.68	90	4.475	1.01	120	8.072	.134
31	0.531	.35	62	2.124	.69	91	4.576	1.01	121	8.210	.135
32	0.566	.36	63	2.193	.71	92	4.677	1.03	122	8.348	.135
33	0.602	.37	64	2.264	.71	93	4.780	1.03	123	8.487	.136
34	0.639	.38	65	2.335	.72	94	4.883	1.04	125	8.625	.137
35	0.677	.39	66	2.407	.73	95	4.987	1.06	126	8.764	.138
36	0.716	.40	67	2.480	.75	95	5.093	1.07	126	8.903	.139
37	0.756	.42	68	2.555	.76	97	5.200	1.07	127	9.042	.140
38	0.798	.42	69	2.631	.76	98	5.307	1.09	128	9.181	.141
39	0.840	.44	70	2.707	.78	99	5.416	1.10	129	9.320	.142
40	0.884	.45	71	2.785	.79	100	5.526	1.11	130	9.460	.143

Suppose

Example.

Suppose a piece of Timber Inches 48 in
Compass and 20 Feet Long:

How many Feet is contained therein?

Feet &c

48 Inches compass per Table gives — 1. 273
multiplied by the Length in Feet — 20

Respons: The content 25. $\frac{1}{2}$ Feet fere — 25.460
whereas taking 12 Inches to be the square
(which is one fourth of the Compass) it would
yeild but 20 Feet. And reckonnig 10. $\frac{1}{2}$ In-
ches the inscribed square it would give but 16
Feet, &c.

Feet &c.

The { Incribed square 10. $\frac{1}{2}$ — 16. 040
 { Full Content — 25. 460

The { Summe — 41. 500
 { Half is — 20. 750

Content by taking $\frac{1}{2}$ of the Compas. 20. 000

But a good way what ever forme the Tim-
ber be of, whether square or Round, regular
or irregular, provided it be streight and all
along equal, is to find the Area of the end the-
reof, and then how many Feet, &c. are in a
Foot length, which multiplied by any Length
in Feet, gives the Content in Feet, &c.

*How to find the Area of any piece of Round
Timber Having the Diameter, or
Circumference.*

Rule

Rule.

Multiply the square of the Diameter given by this Decimal fraction. 78544 (the Area of a Circle whose Diameter is Unity) the product distinguishing 4 figures towards the right hand by a point, according to the doctrine of Decimals is the Area or multiply the square of the circumference by .0796 ($\frac{1}{4}$ of the Quotient of unity or 1 with Cyphers divided by 3.141592) the product cutting off 4 figures is the Arc.

A Table shewning the Solid Content of one Foot Length of any Piece of Timber according to the Area at the end thereof.

[illegible]

The Construction of the preceding Table.

Divide the Area of any piece of Timber with cyphers annexed by 144 (*the Area of the end of a cubick Foot*) the quotient is the solid content of one Foot Length.

Example.

144) 1.000 (0.007 144) 10.000 (2.069
 144) 100.000 (0.694 144) 300.000 (2.083
 Feet &c.

Suppose the Area per Table is — 2.778
 Multiplied by the Length in Feet — 30

Reffons: The Content 83. $\frac{1}{2}$ + — 83.340

Let a piece of Timber be 48 Inches in Compasse, and 20 Feet Long: How many Feet of Timber is containd therein?

48 Inches compasse squared is — 2304

Multiplied by the proper multicator. 0796

The product is the Area — 1843985

Area $\left\{ \begin{array}{l} 100 \\ 83 \end{array} \right\}$ per Table gives $\left\{ \begin{array}{l} 0.694 \\ 0.583 \end{array} \right\}$ Feet &c.

Summe — 1.277

Multiplied by the Length — 20 Feet

Reffons: The Content — 25.540

If a piece of Timber be 8 Inches broad, 5 Inches deep, and 10 Feet Long: what is the Content in Feet, &c.

5 \times 8 gives the Area 40 which per Tab. is 0.278
 Multiplied by the Length in Feet — 10

Reff:

Resp: The Content $2\frac{1}{2}$ Feet *prope* 2.780

How to Measure Tapering Timber.

Tapering Timber is either a Pyramid, or a Cone, or a Frustrum of one of them.

If it be a whole Pyramid, or Cone, havenig but one Base, and terminating in a point then

Multiply the Area of the Base by one third part of the Altitude, or Length, or one third of the Area by the whole Length the product is the Content.

Not.

That a Pyramid hath an Angular Base of, three, four, five, six or more sides, from whence it diminisheth equally less and less till it end in a point at Top.

A Cone is a Solid which hath a Round Base (like a sugar Loaf) from whence it decreases equally less and less till it finish in a point at the Top.

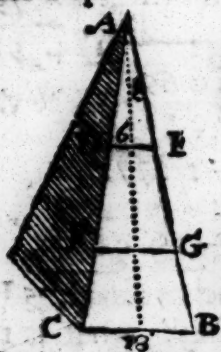
Example.

1. Let A B C represent a Pyramid 45 Feet Long, and B C the Base 18 Inches square.

By the Table (pag. 11.) Feet, &c.

18. Inches square is = 2.250

Mmultiplied by $\frac{1}{3}$ of the Length ————— } 15



Resp: The content?

So the whole Pyramid ————— } 33.750

Suppose only the Frustrum D E C B were to be

be measured the Length D C 30 Feet, the Lesser Base D E 6 Inches Square, and the Greater Base B C 18 Inches Square as above.

The common way to measure these Frustum's is to take the square or compasse in the middle but that way gives the Content alwayes too litle, and the more tapering the worse.

Example.

18 Inches and 6 make 24 whose half is 12 Inches for the square in the middle at F G therefore the Content must be 30 Feet. Soe there would be lost $2\frac{1}{2}$ Feet of Timber for 30 Feet and 1.250 make but 31.250 Feet, whereas it is really 33.750 Feet, &c.

A Geometrical way to measure these Frustum's.

1st. Find the Length of the whole Pyramid thus —————

As the Difference of the 2 ends — 12 Inches
to Length between them — 30 Feet

So is the greater Base — 18 Inches
to the whole Length — 45 Feet:
30 Substr.

Rests the length of the piece cut off — 15

Thus having the Length of the whole Pyramid, the Content is found as before. 33.750 Feet.

Then by the Area of the Base at the lesser end, and one third part of the Length of the piece

piece cut off find the Content, as if it were a whole Pyramid thus —

Feet, &c.

6 Inches square per Table pag. 11. gives — 0.250
 which multiplied by $\frac{1}{3}$ of the Length — 5

Reft: The content of the piece cut off — 1.250
 which subtracted from 33.750 Feet the Content of the whole Pyramid, there remains 32.500 Feet the Content of the Frustum D E B C required.

I. Rule Arithmetically.

- I. Square the Inches of the Greater Base.
- II. Square the Inches of the Lesser Base.
- III. Multiply the Inches of the two Bases one into another.

IV. Add the three summes together, and multiply the totall by one third part of the Length in Inches, and divide the product by 1728. the quotient is the content in Feet, &c.

Examples.

6. Lesser Base Squared —————	36
18. Greater Base Squared —————	324
18. Multiplied by 6. gives —————	108
Summe —————	468
Inches in 10 Feet —————	120

1728) 56160.0 (32.5

Reffons: The Content 32. $\frac{1}{2}$ Feet.

Let

1. Let A B C represent a Cone 45 Feet Long, and the circumference at the Base B C 56. $\frac{1}{2}$ Inches, Feet, &c. By the Table pag. 16, 56. $\frac{1}{2}$ circumf. is 1. 763 Multiplied by $\frac{1}{4}$ of the Length ——— 19

Resp. The Content of the whole Cone 26.445

Suppose only the Frustum D E B C to be measured the circumference at D E the lesser Base 18.75 Inches, at B C the Greater Base 56. 5. Inches and D C the Length 30. Feet, what is the Content?

1st. Find the Length of the whole Cone, as you did the Length of the whole Pyramid thus.

As the Differences of circumferences at the ends ——— 37. 75 Inches

to the Length between them — 30 Feet

Soe is the Greater Circumference — 56. 5 In.

to whole Cone, Length — 45 Feet,

Thus Having the Length of the whole Cone, the content will be found as above 26.

445 Feet, &c. Then ——— Feet, &c.

18. $\frac{1}{4}$ per Table (pag. 16.) gives — 0. 189

multiplied by $\frac{1}{4}$ of the piece cut off — 5 Feet

Resp. The Cont. of the piece cut off 0.945

Which subtracted from 26. 445 the Content of the whole Cone, rests 25. 5 Feet the Content of the Frustum D E B C as was demanded.

Lesser } Base { 6 } Inches
 Greater } { 18 }

The } Summe 24 Feet, &c.
 } Half 12 per Tab. (p. 11.) gives 1.000
 6. semi-difference of squares gives } 0.083
 0.250 whole $\frac{1}{4}$ is —————

Summe — 1.083
 Multiplied by DC the Length — 30
 Resp: The Content of the Frustum — 32.490

Example.

Let DEBC be the Frustum of a Cone DC
 the Length 30 Feet.

The circumfer. { DE = 18.75 Lesser } Base
 { BC = 56.5 Greater }
 Summe = 75.35 Feet &c.

Per Table pag. 16 — Half = 37.67 is — 0.777
 18.82 Semi-difference of circumferen- }
 ces 0.216 whole $\frac{1}{4}$ is ————— } 0.073

Summe — 0.850
 Multiplied by the Length DC — 30
 Resp: The Content of the Frustum — 25.500.

F I N I S.

1. *Aritmetically.*

Haveing found the Diameters of the Bases follow the (1 Rule pag. 21.) and you will have the Content only instead of dividing the last product by 1728. you must divide by 2200.

Examrle.

Product found

2200 (561 60. 0 (25. 5.

Resp. The Content as before 25. $\frac{5}{8}$ Feet.

III. *Haveing the Dimensions of the Frustum of a Pyramid or Cone, to find the solid Content in Feet &c. another way by the Table.*

Rule.

Enter the proper Table with half the Summe of the squares, or Circumferences and take out the Numbers against the same, to which add one third of the Number against the semi-difference of squares or circumferences the summe multiplied by the Length in Feet &c. produces the Content required in Feet, &c.

Example.

Let BEBC be a Frustum of a Pyramid, DE the lesser Base, 6 Inches square BC the greater Base 18 Inches square and DC the Length 30 Feet: How many solid Feet of Timber is contained therein?

Lesser

Having found the Directors of the Bank follow their Religion, and you will have the Government mind in dividing the land.

5. 10. 1

Product Code

7 8 9 0 1 2 3 4 5 6

Ref. The Court in London 22. 1. 1941

III. Having the Transcript of the original

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LIST 902

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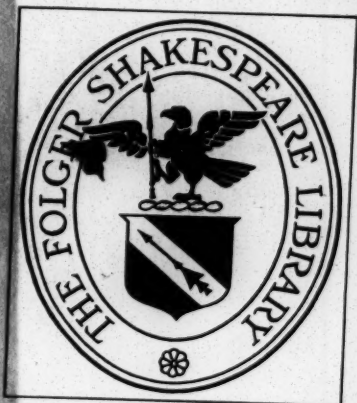
Enter the proper Table with half the Sum-
m of the squares, or Circumferences and take
out the Number again the same, to which
add one third of the Number against the semi-
distance of the square or circumference the
Number resulting is the Length in Feet &c.
And the Content required in Feet &c.

1. 1944

The BEEC is a product of a Pyramid,
 The latter BEEC, 6 inches square, B C the
 greatest BEEC, 12 inches square and D C the
 length of the foot: How many solid feet?

1-11-1

H3763.5



H3763

